# Emerson Network Power

## Enabling Business-Critical Continuity™

Aplicación de rango medio para famila de UPS

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# NX Family Product Line

10, 15, 20, 30, 40, 60 80, 100 ,120, 140, 160, 200 kVA

*14,000 installed Worldwide*

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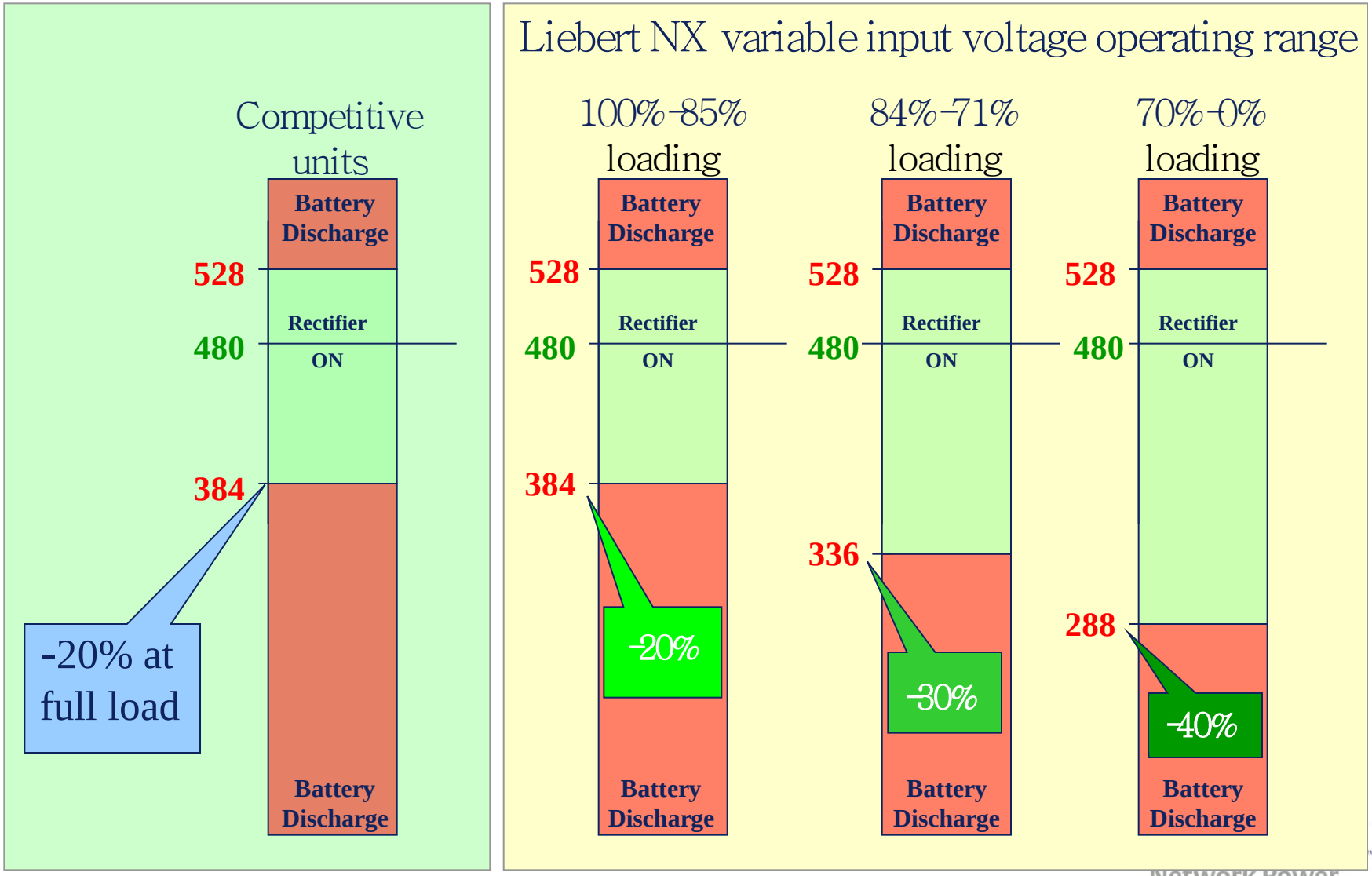
# Wider rectifier operating range means less battery use and lower cost of ownership

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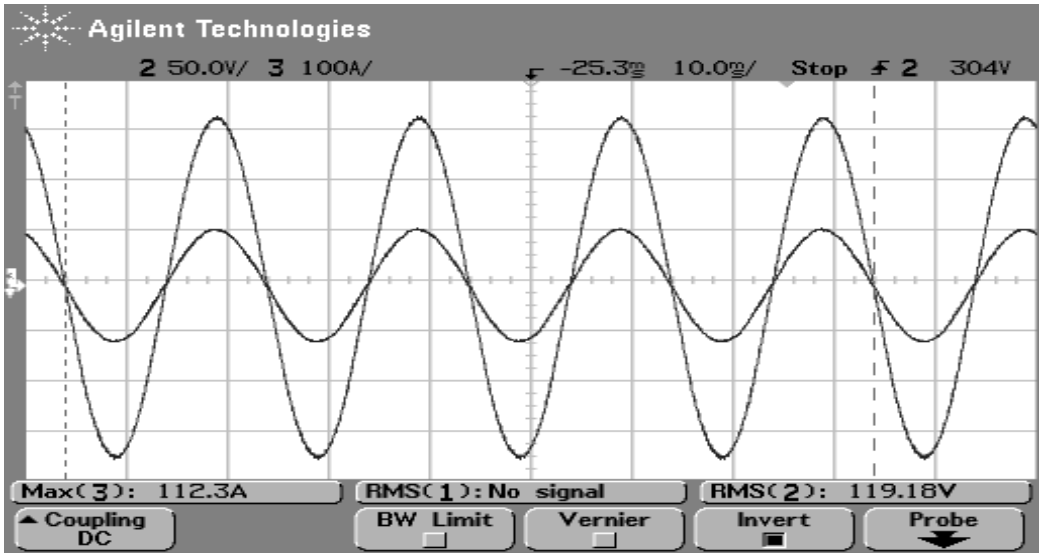
# Liebert NX limits THD

- Input THD of less than 5% and near unity PF




30kVA input THDi and PF with 208V rating voltage

| | 100% linear | 100% nonlinear |
|---|---|---|
| THDi_A (%) | 2.269 | 4.328 |
| THDi_B (%) | 1.972 | 4.082 |
| THDi_C (%) | 1.882 | 4.244 |
| PF_A | 0.9999 | 0.9999 |
| PF_B | 0.9999 | 0.9999 |
| PF_C | 0.9999 | 0.9999 |

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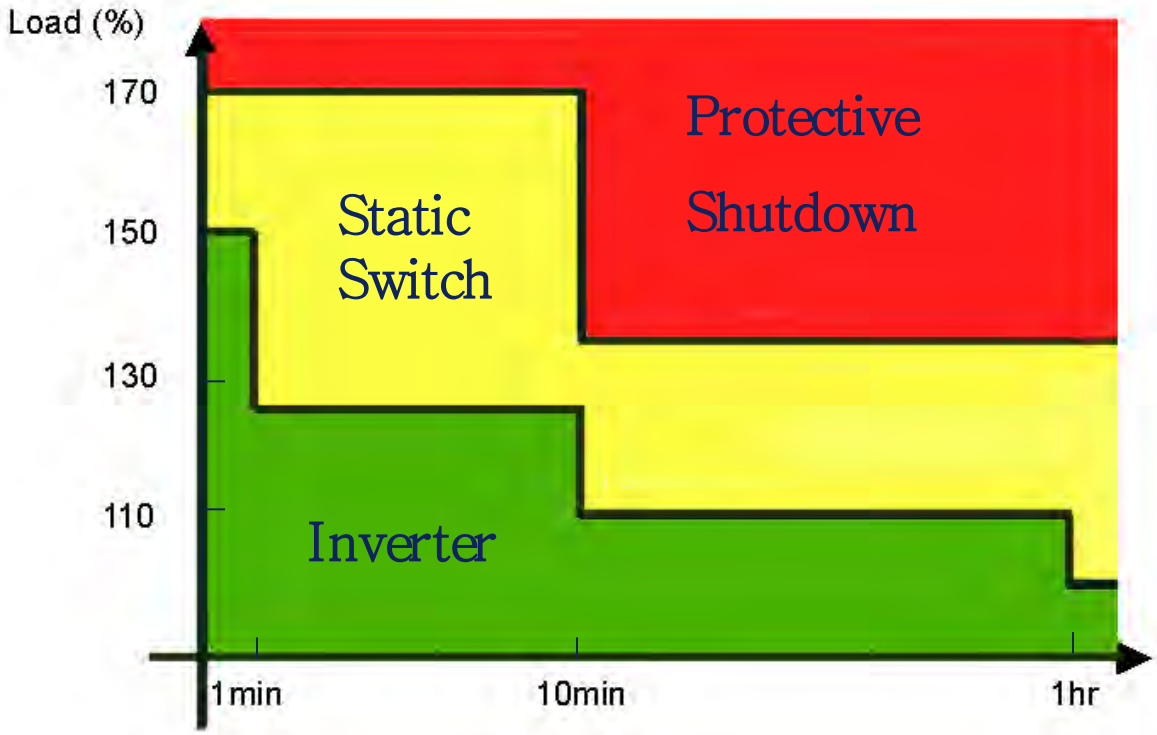
# Advantage - High Overload Capacity

- Inverter mode
  - 100 – 110%, 1hour
  - 110 – 125%, 10min
  - 125 – 150%, 1min
- Bypass
  - 100 – 135% Long term
  - 135 – 170% 10mins
  - 1000% 100ms

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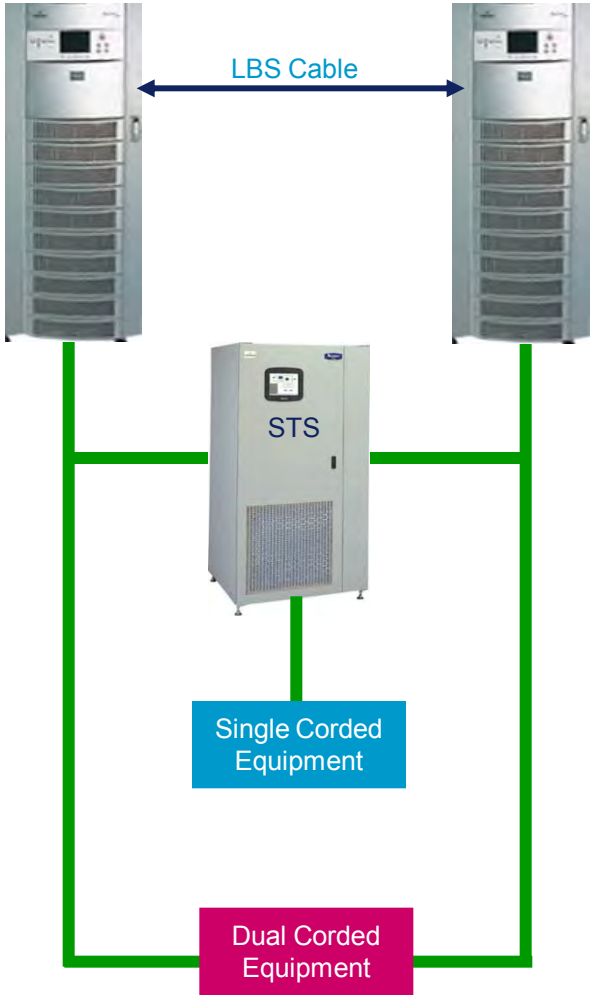
# Liebert NX - Load Bus Sync (LBS) Option




- **Provides necessary communications to allow two "independent" UPS systems to synchronize for downstream equipment**
  - **Static Transfer Switches (STS)**
  - **SmartSwitches**
  - **Dual corded equipment**
- **For Liebert NX to Liebert NX dual bus systems, we only need the LBS cable, as the controls are already built into the units**
  - **LBS cable lengths of 5, 10, and 15 meters are available**

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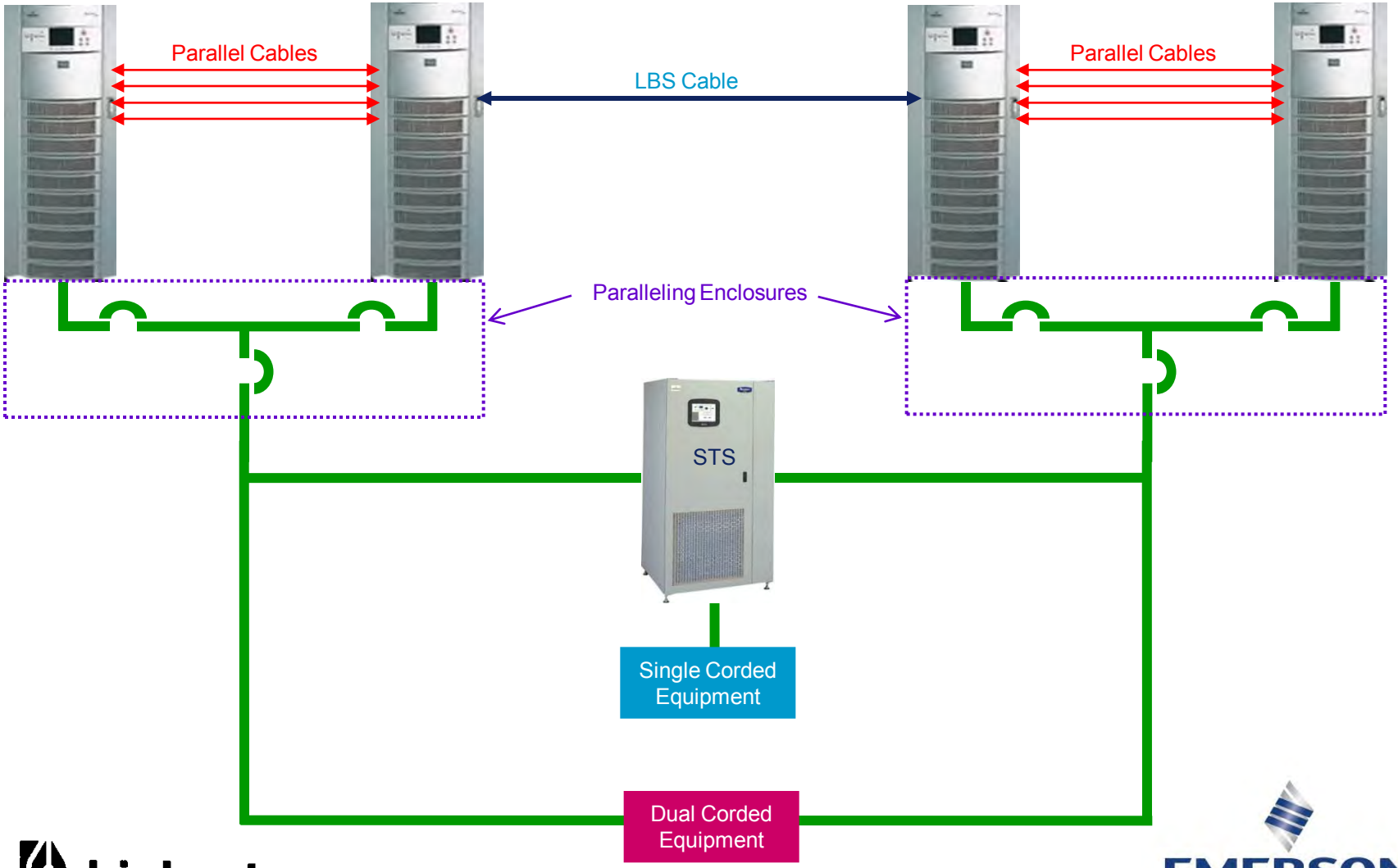
# Liebert NX 1+1 Parallel Redundant – Dual Bus System

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# Liebert NX 480V - Product Introduction

- **The Liebert NX 480V / 40 – 200 kVA**

Main key attributes

- 480V standard voltage, 0.9 power factor
- Minimal footprint with standard rack appearance
- Optimized energy efficiency at any load level
- 40, 60, 80, 100, 120, 160, 200 kVA
- Softscalable$^{tm}$ in 20 kVA increments via controlled software

40 kVA Scalable to 80kVA

80kVA Scalable to 120 kVA

160kVA Scalable to 200kVA

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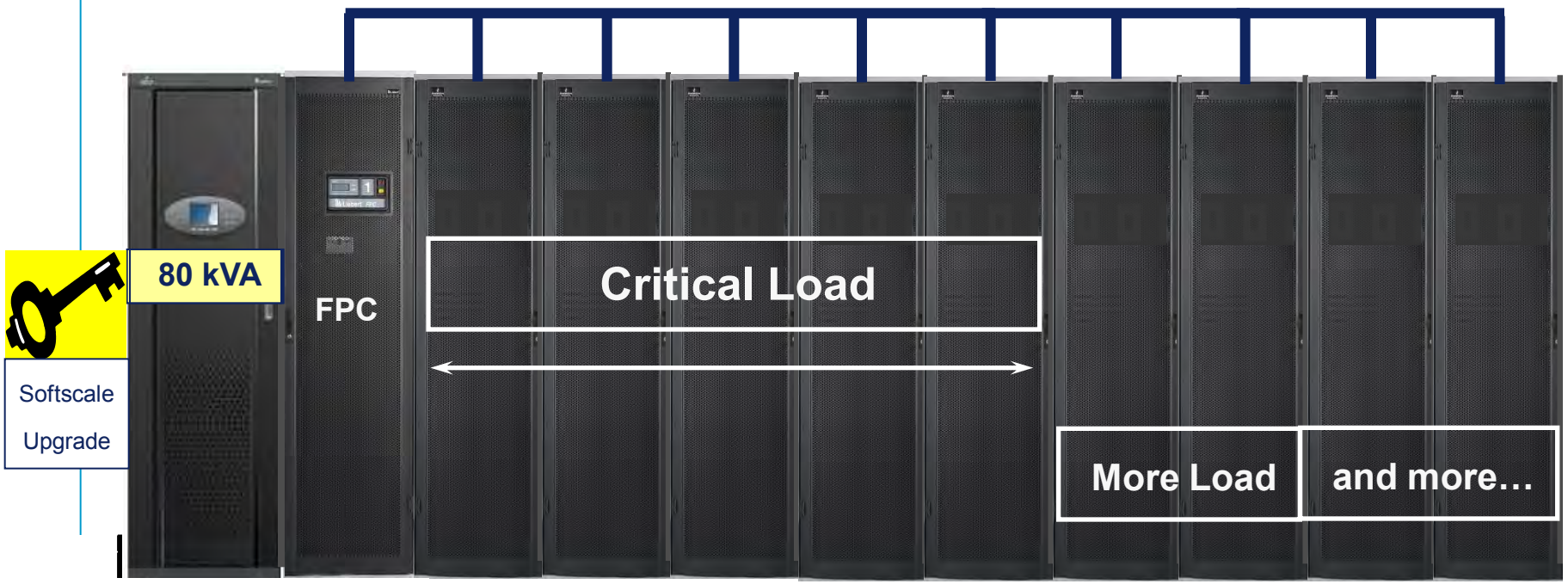
# Liebert NX 480V - Softscale

- Select the capacity you need
- Buy the 20kVA upgrade and buy it through your service organization
- No need for additional hardware, no reliability issues
- Capacity can be increased to 60 or 80 kVA



# Liebert NX 480V- Paralleling Options

- Protect your investment by adding only the capacity you need
  - Change your growth increment when your business requirement changes
  - Mix and match modules with different capacity ratings
    - ✓ 200 kVa + 160 kVa = 360kVA in capacity or 160kVA in redundancy

✓ Upscale the second unit and get 400kVA in capacity or 200kVA in redundancy

200 kVa

160 kVa

✓ Paralleling Cabinet

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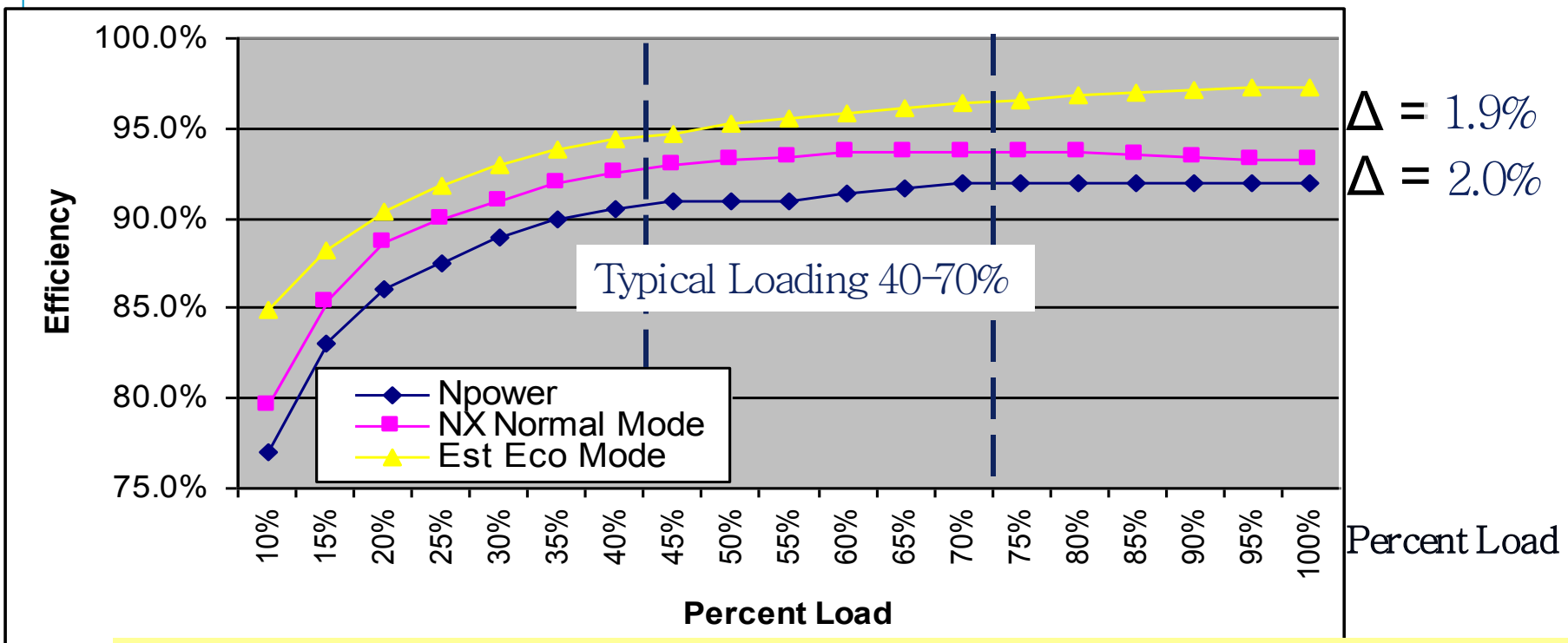
# Liebert NX 480V - Greater Efficiency




- Medium Data Center, 40 racks, 2 x NX 120 kVA UPS
- 2% Efficiency gain saves $3,800 annually (assuming $0.10 per kW Hr)
- Over 5 years savings is $19k…

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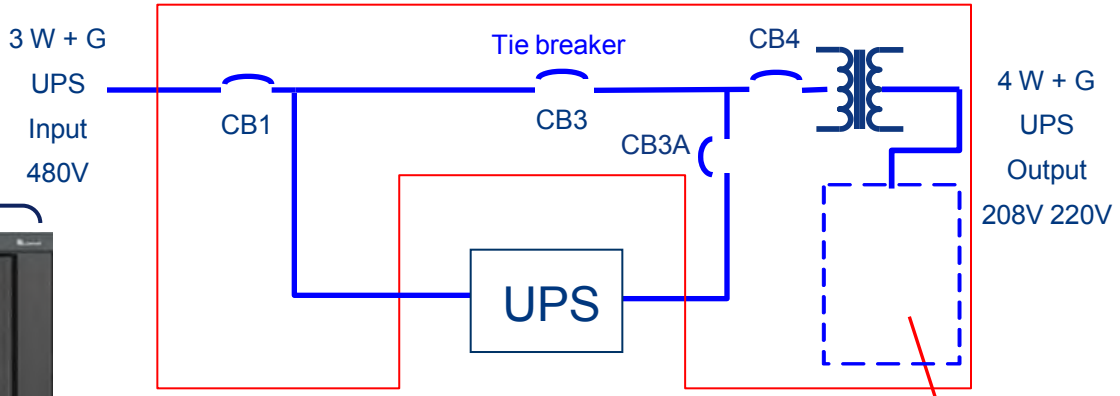
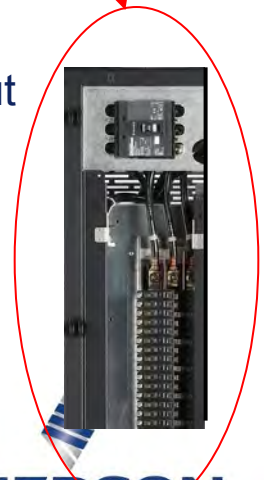
# Liebert NX 480V – Ancillary BDC

## BDC – Bypass Distribution Cabinet




External Maintenance Bypass
With Iso output transformer

- 480V input and 208/220V output
- Racks appearance
- Cooper transformer
- Low cost
- Distribution
  - ✓ 42 poles panelboard
  - ✓ or I-Line panel
  - ✓ or nothing



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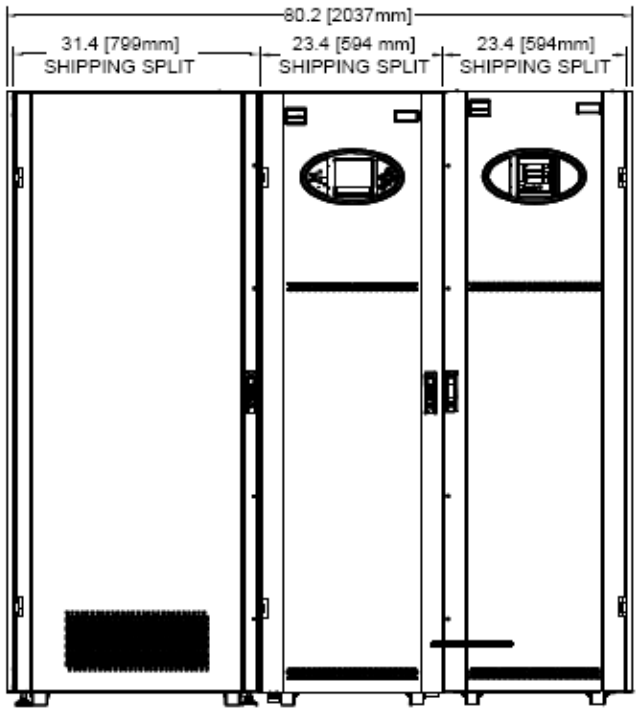
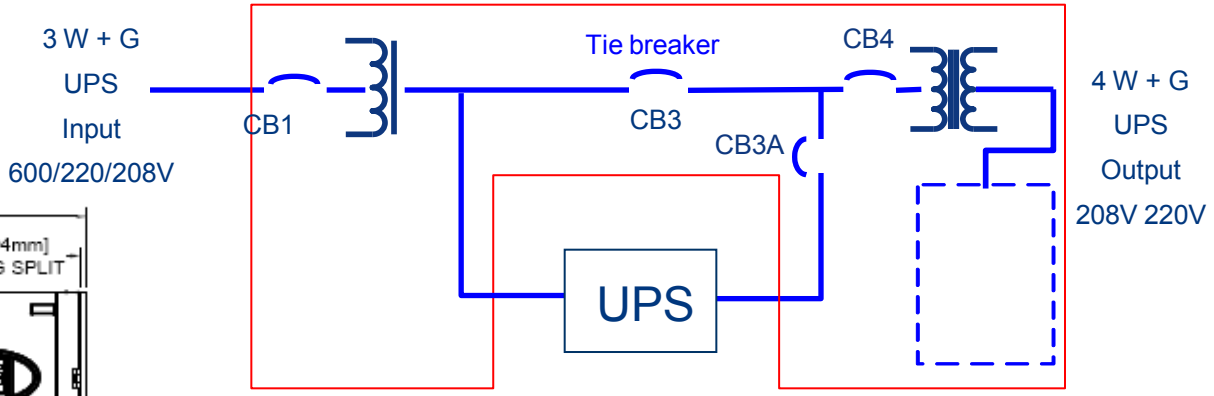
# Liebert NX 480V – Ancillary BDC

## BDC – Bypass Distribution Cabinet with Input and Output Transformer




FRONT VIEW




External Maintenance Bypass

With auto transformer and iso output transformer

- 600V, 220V, and 208V input and 208/220V output
- Racks appearance
- Copper transformer
- Low cost
- Distribution
  - ✓ 42 poles panelboard
  - ✓ or I-Line panel
  - ✓ or nothing

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# Liebert NX 480V - Key Benefits

- Softscale$^{tm}$ technology enables simpler, faster response to changes in data center power requirements
- Softscale$^{tm}$ allows small and medium enterprises to install future UPS capacity today – but pay for only current capacity requirements
- Softscale$^{tm}$ allows growth without adding additional modules; total cost of ownership and high availability are both maintained
- Allows small and medium data centers to take advantage of the higher reliability and lower cost per kilowatt of a large UPS compared to many smaller UPS's
- Protects your investment with the ability to add additional UPS's - for capacity or redundancy – with no changes to your original solution
- Provides a true redundant system when availability is critical to your business
- Highly efficient in normal and Eco operating modes saving you money

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# Liebert NXL

480V/480V, 575/575V ,

600/600V, 0.9 output pf

250kVA/225kW
300kVA/270kW
400kVA/360kW

500kVA/450kW

625kVA/562kW

750kVA/675kW

1100kVA/990kW

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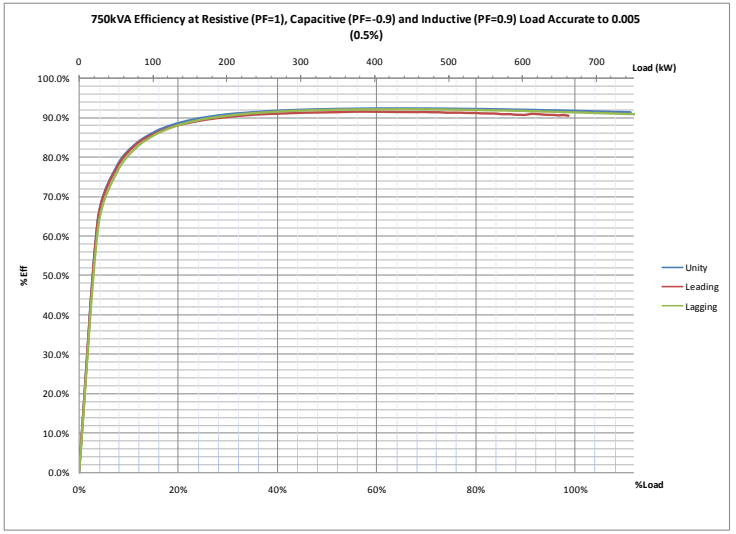
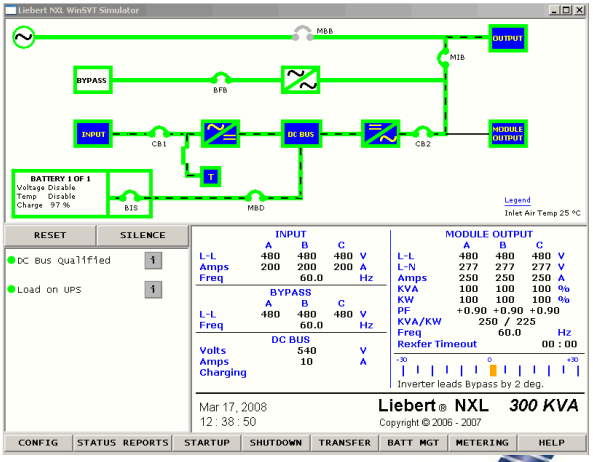
# What's New in NXL

- Employs latest generation IGBTs and advanced inverter logic with active harmonic control
- Optimized energy efficiency with better performance at low loads
- Digital control technology provides precise drift-free regulation of system operation
- Improved color touch screen HMI to reduce risk of human error

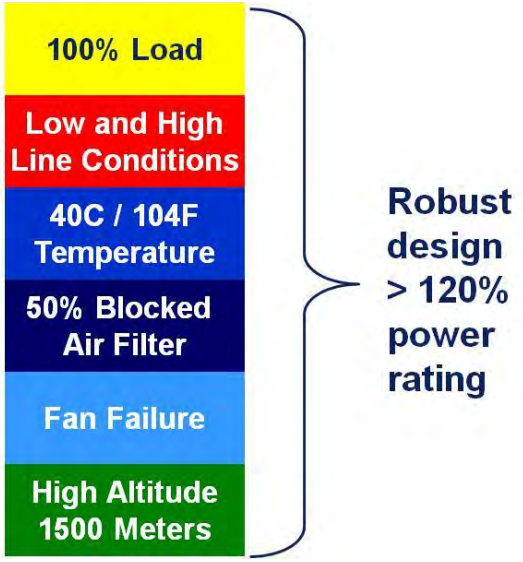


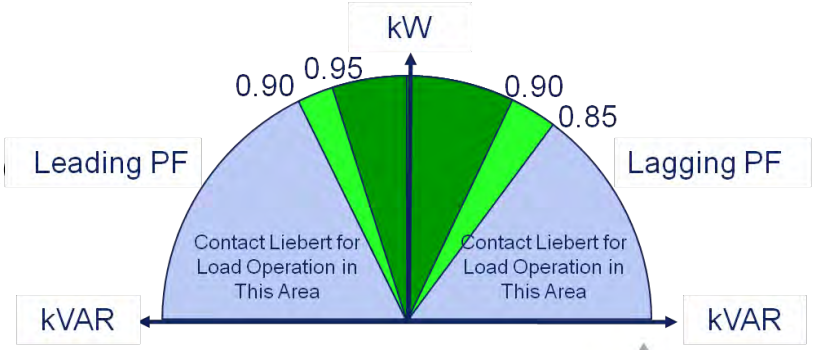



# Liebert NXL UPS

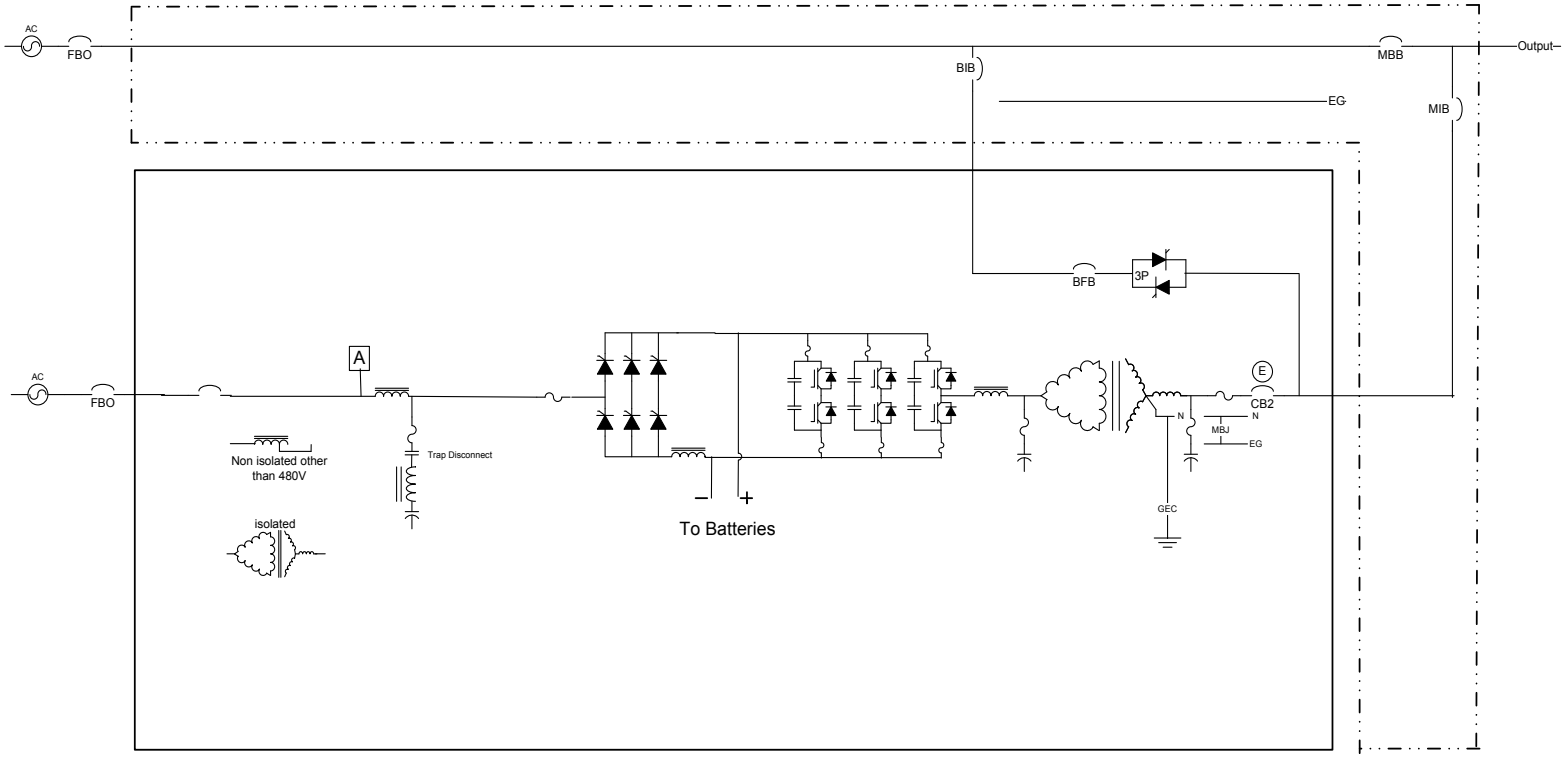
## Enterprise-Scale UPS Protection for Medium/Large Data Centers

- Advanced Global UPS Platform
- Robust design allows operation at 100% load under a “Stack-up” of simultaneous conditions without derating
- First large UPS to be tested and UL Listed to UL 1778 4th Edition
- Up to .90 leading power factor load performance at nominal conditions
- Allows clearing of downstream electrical faults through high overloa capacity



# NXL, Single Module System One-Line
## 6-pulse rectifier



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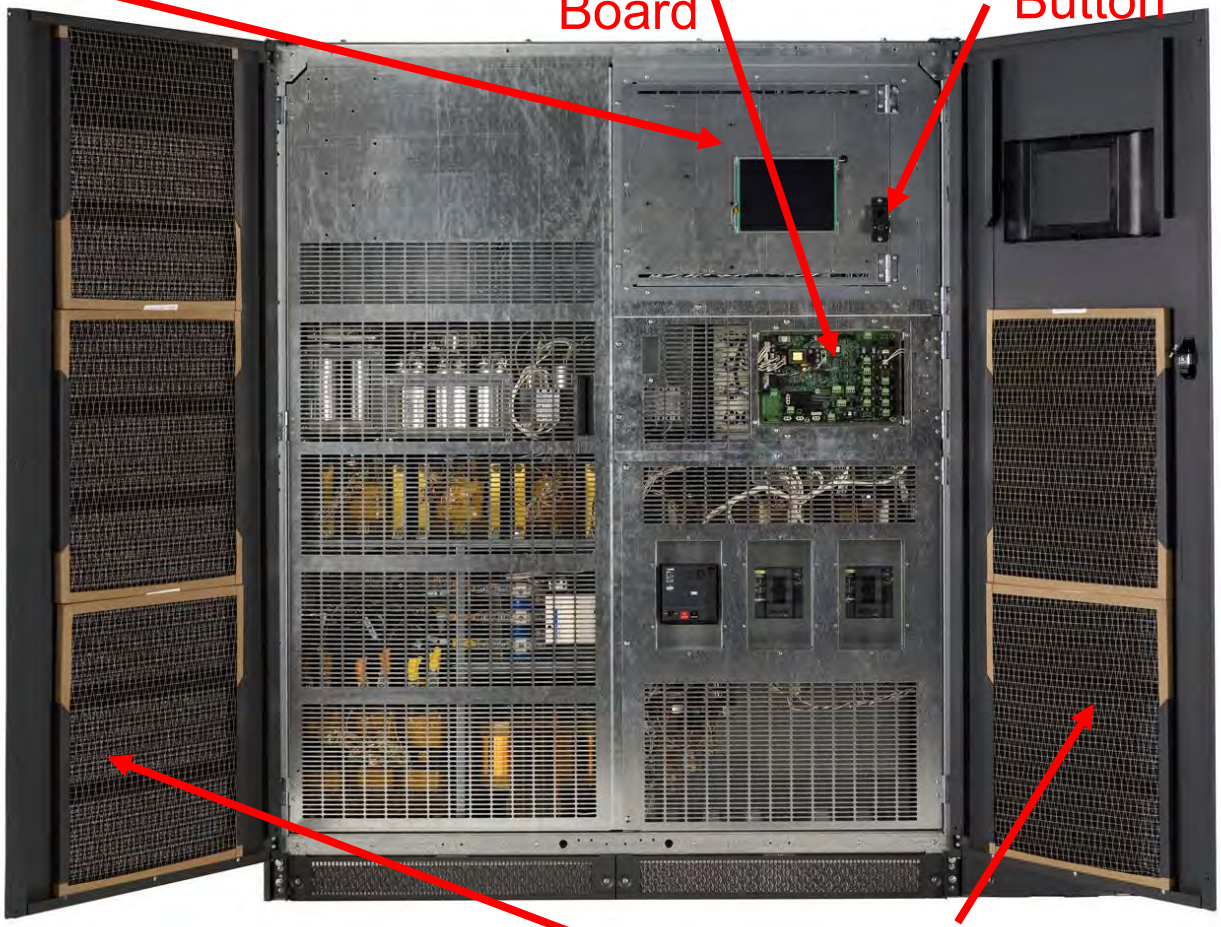
# Liebert NXL – 300 kVA
# First UPS to UL 1778 Rev 4

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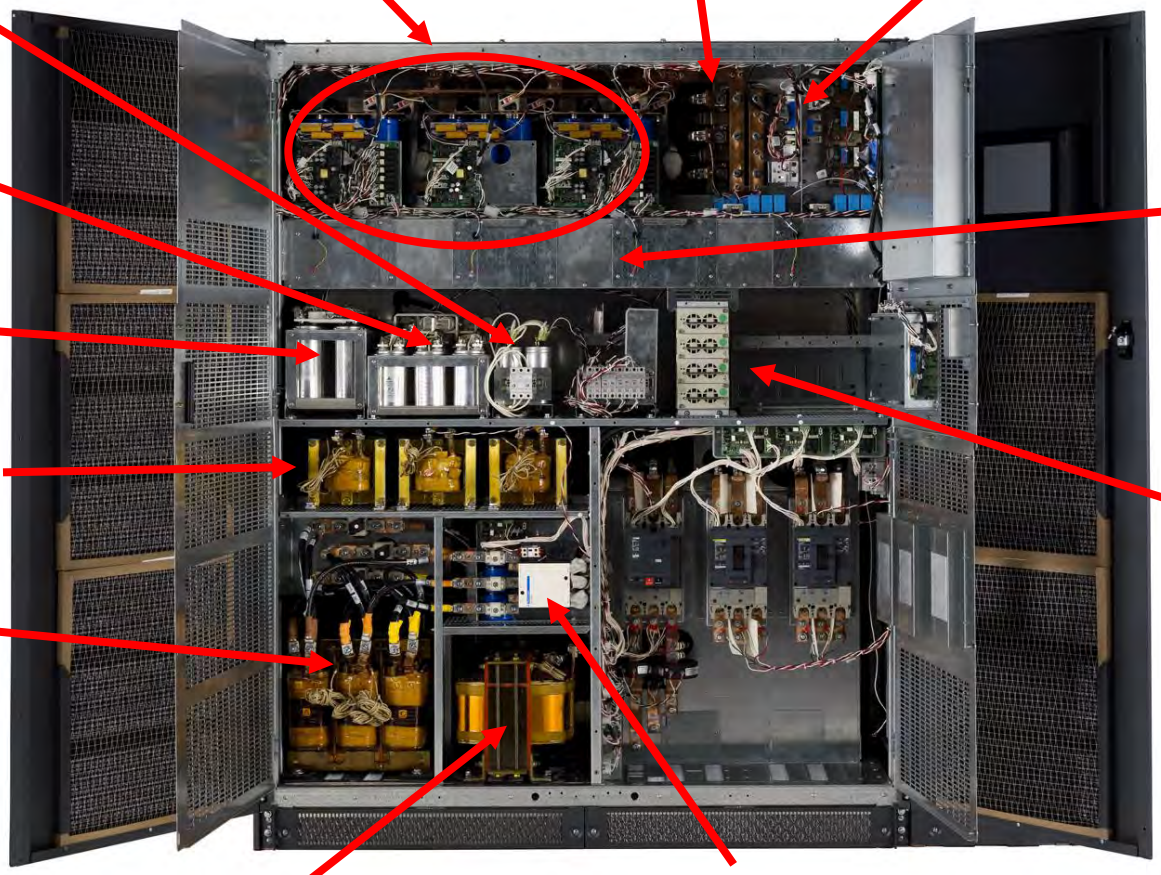
# Liebert NXL – 300 kVA



IGBT Inverters
Rectifier
Static Switch
Grass Filter
Output Filter Caps
Input Filter Caps
Input Filter Inductors
Input Series Inductors
Redundant Fans
Power Supplies
DC Choke
Input Filter Disconnect

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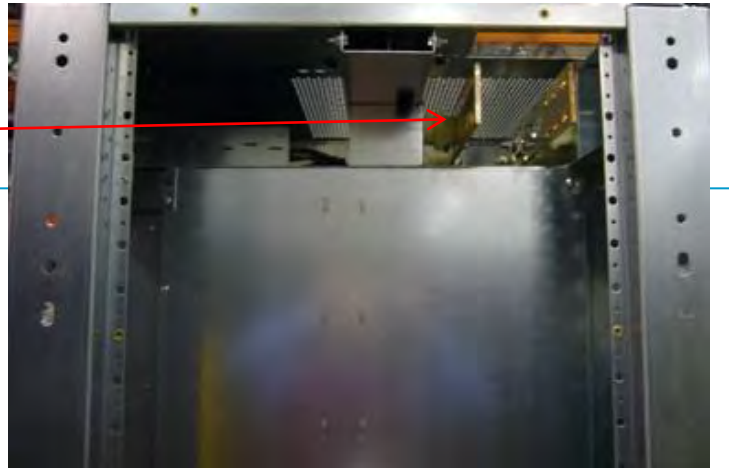
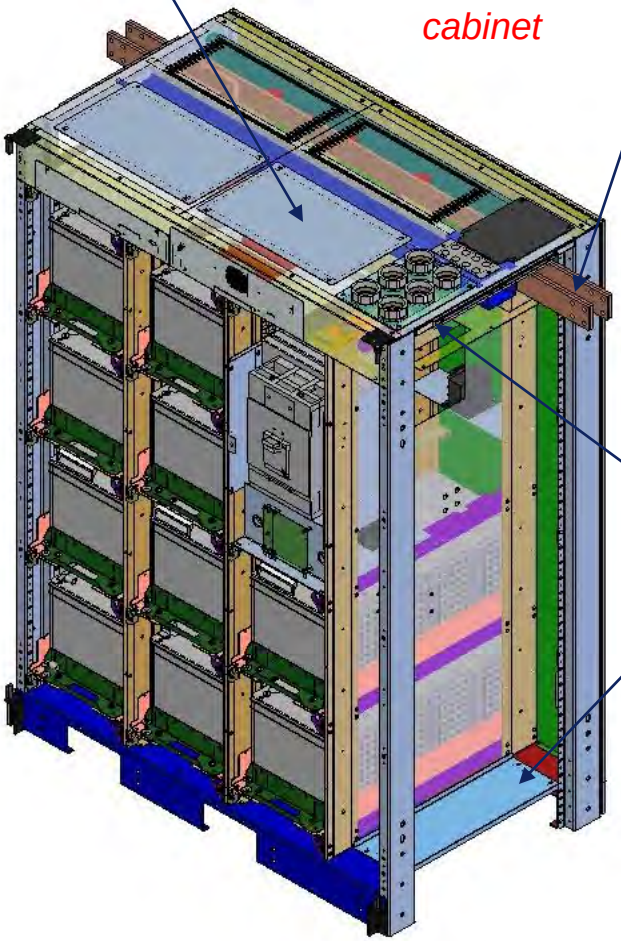
# Battery Cabinet

*Bus rated for max current of 750 kVA*



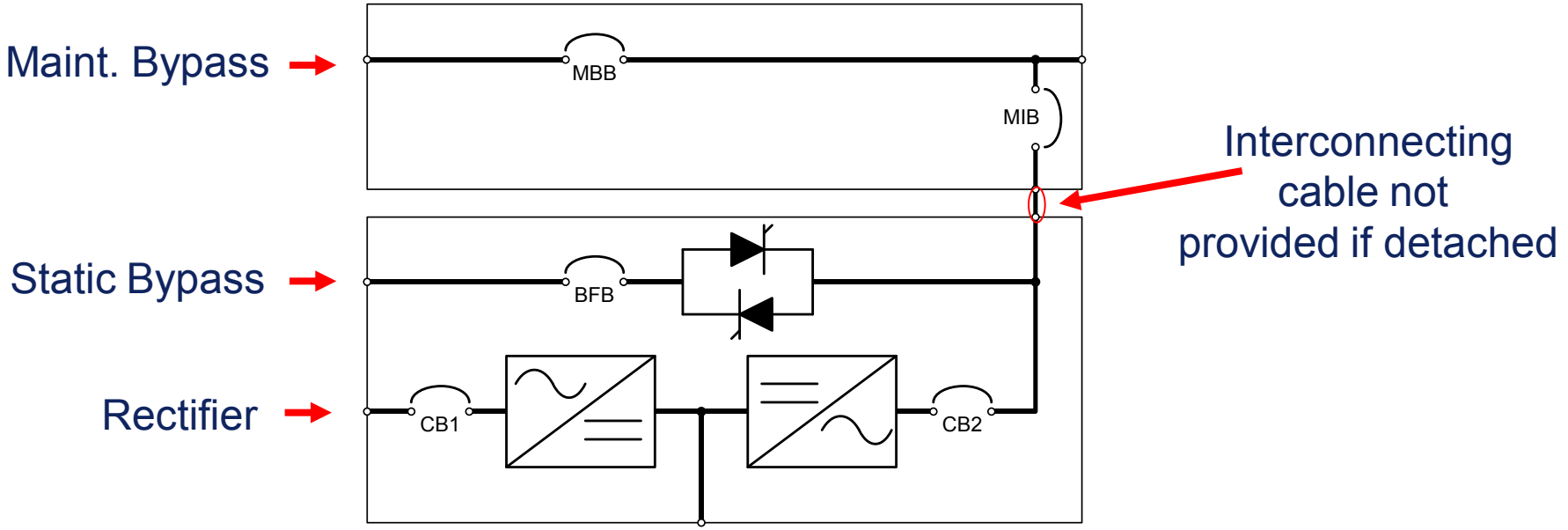
*Top Access For Alber Monitoring Cabinet to Cabinet Cables.*

*Strap Plates For Cabinet to Cabinet*
*Short bus on stand alone cabinet*



*Conduit Landing Up to 400kVA No Tie Cabinet Required*

# Maintenance Bypass Cabinet Configurations




- Two Breaker MBC
  - 1,2 or 3 inputs
  - Single input bus jumper in module
  - Bypass input off MBP

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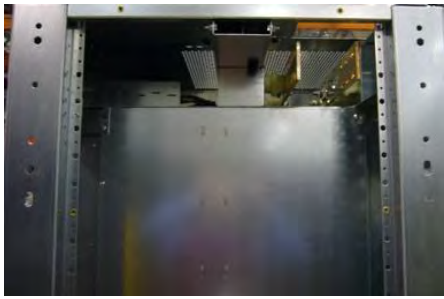
# Liebert NXL – Battery Cabinets



- Battery cabinet(s) may be right or left side installed
  - Connected with drop-in Buss links
- EXCEPT when applied with matching maintenance bypass – battery cabinet(s) must go on the left

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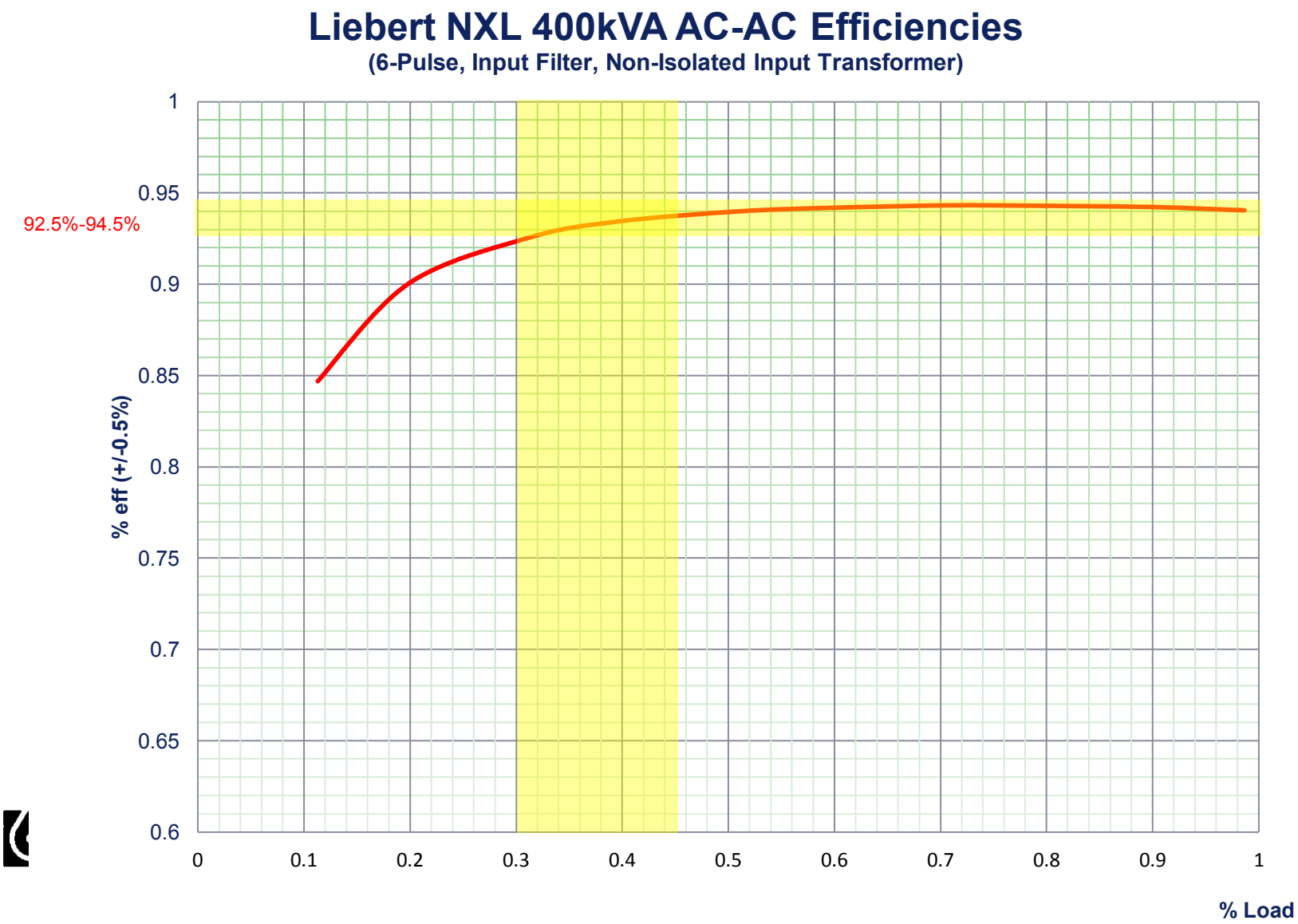
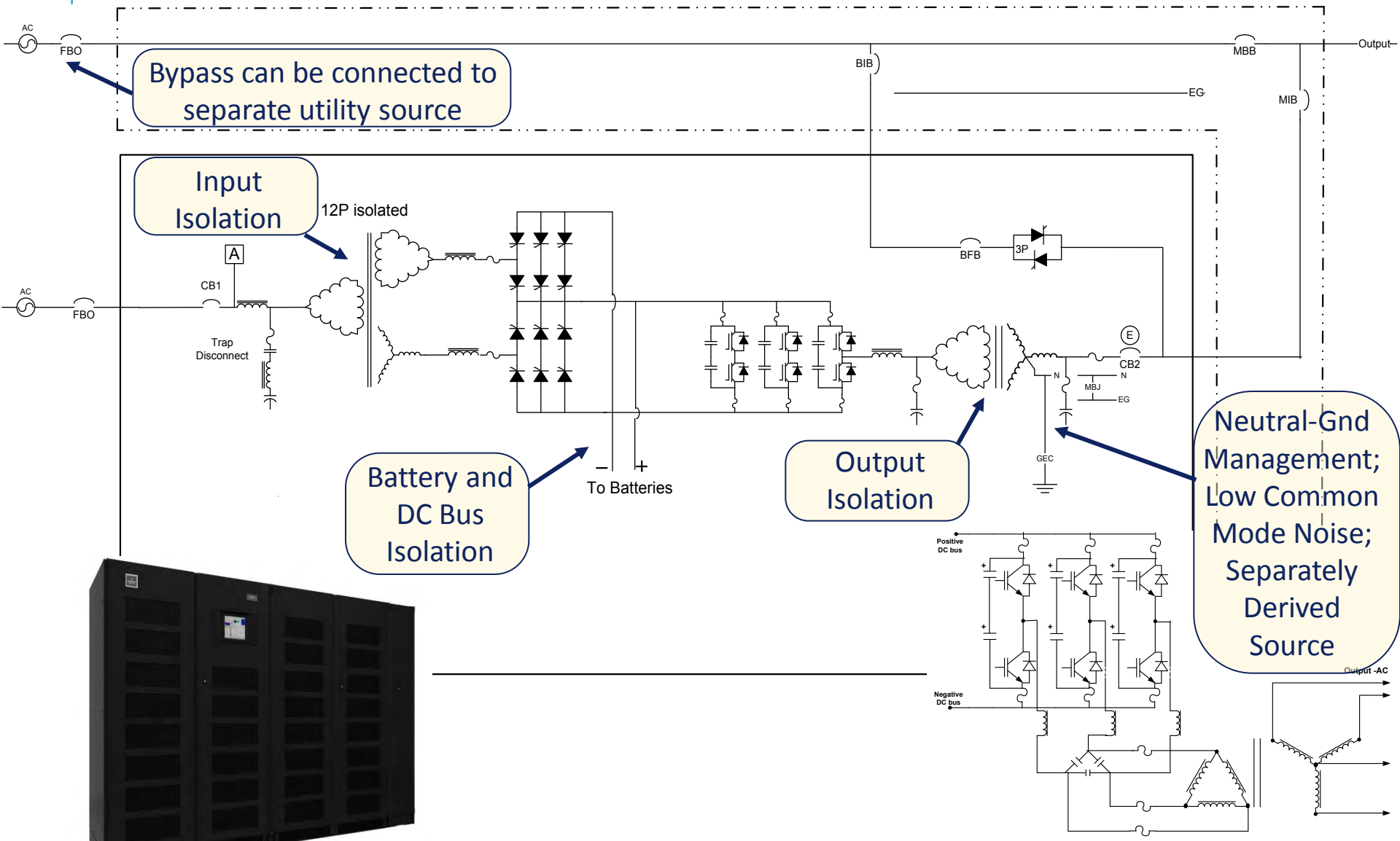
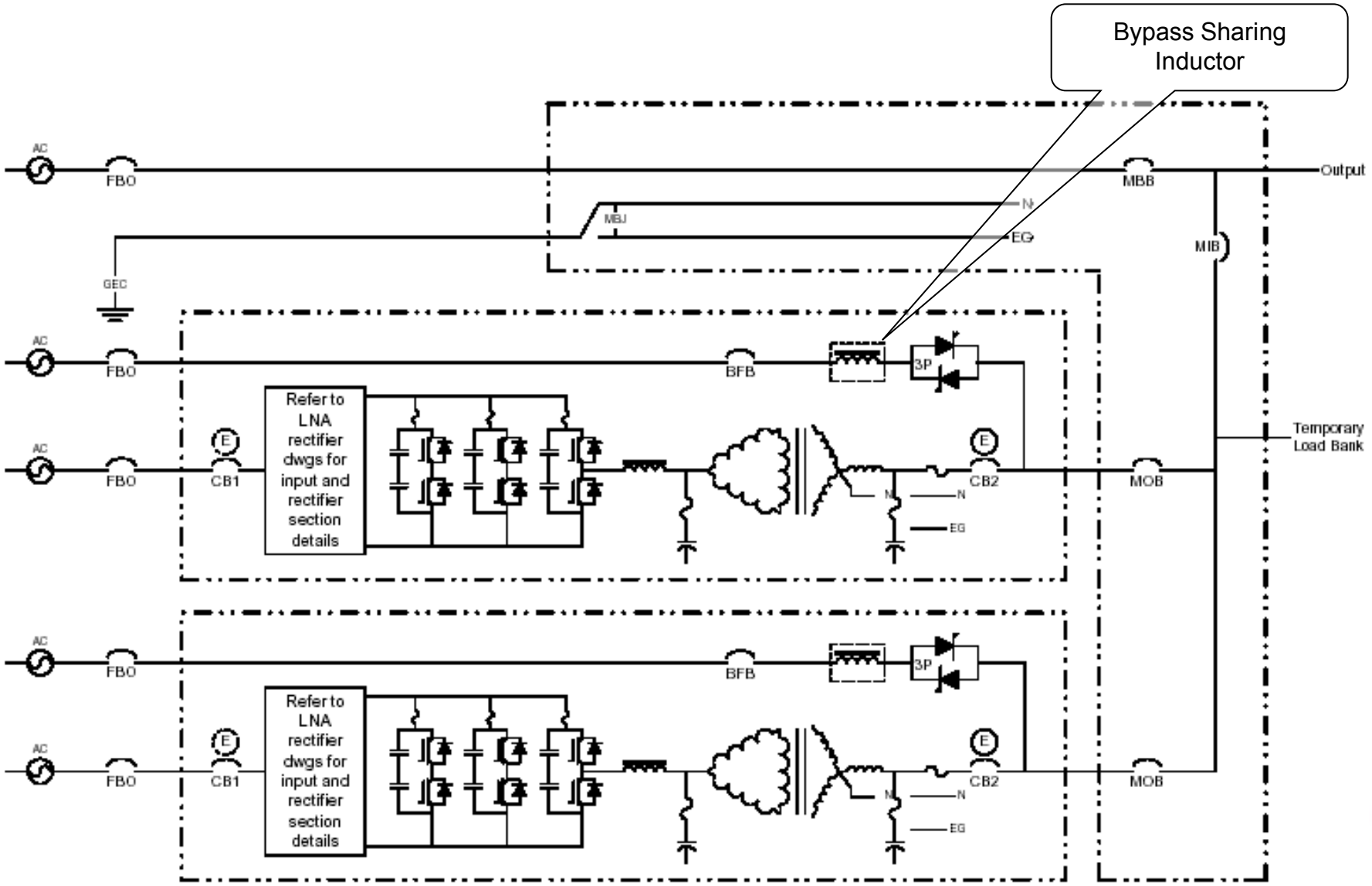
# NXL Efficiency Chart – 6 pulse



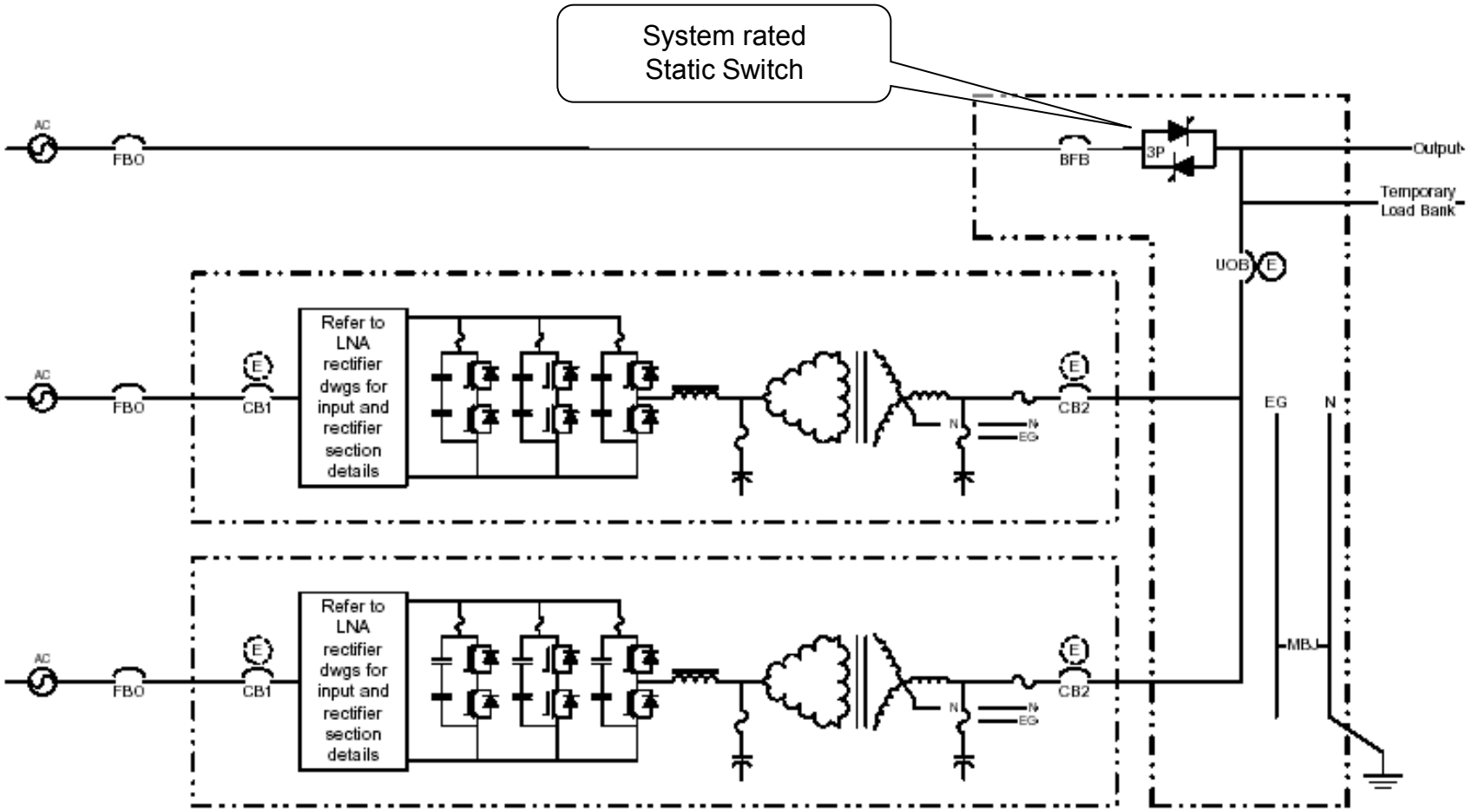
# Liebert NXL,
## Single Module System One-Line, 12-pulse rectifier



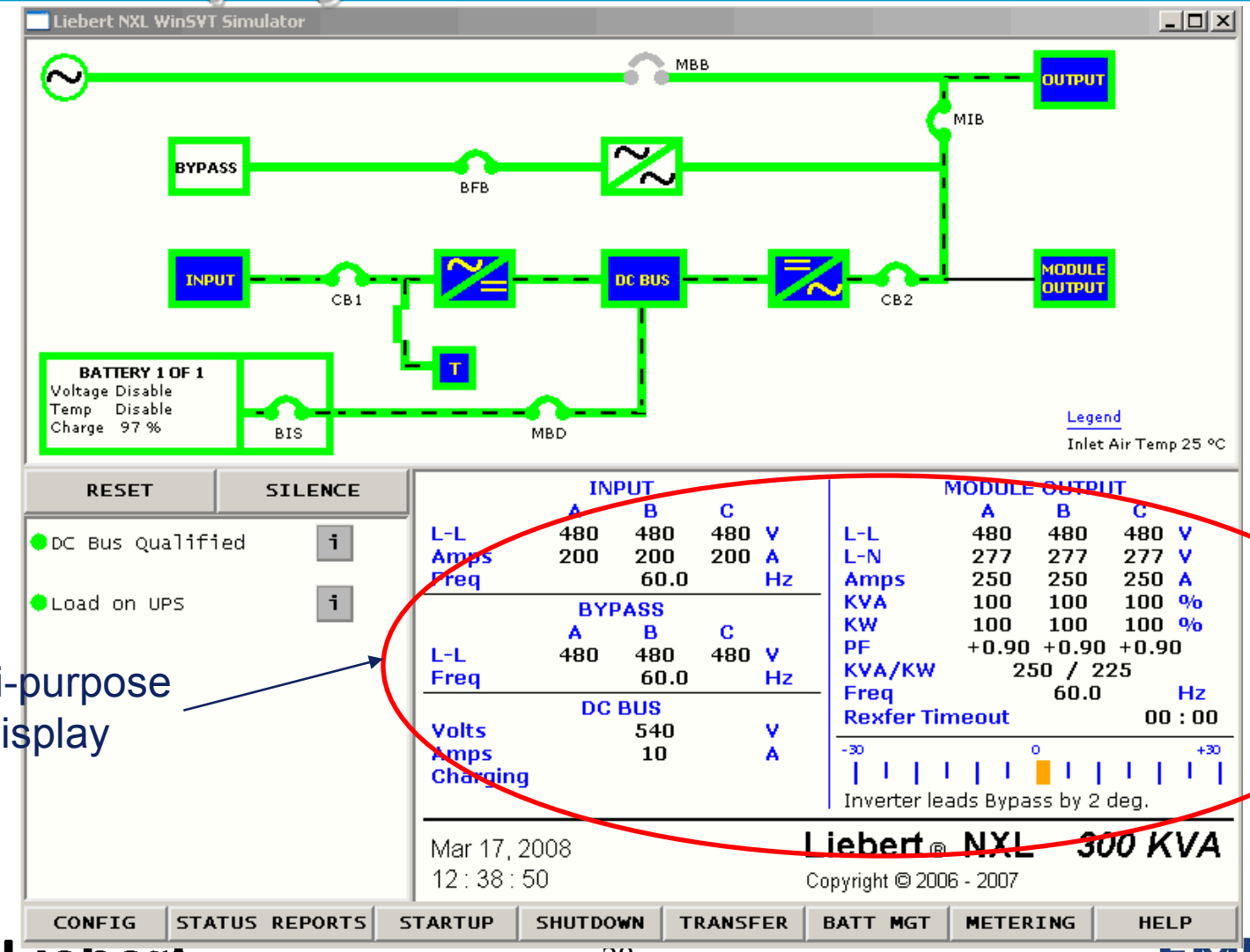
# Liebert NXL – One-Line
## 1+N (Distributed Static Switch)



# Liebert NXL – One-Line
# N+1 (System Static Switch)

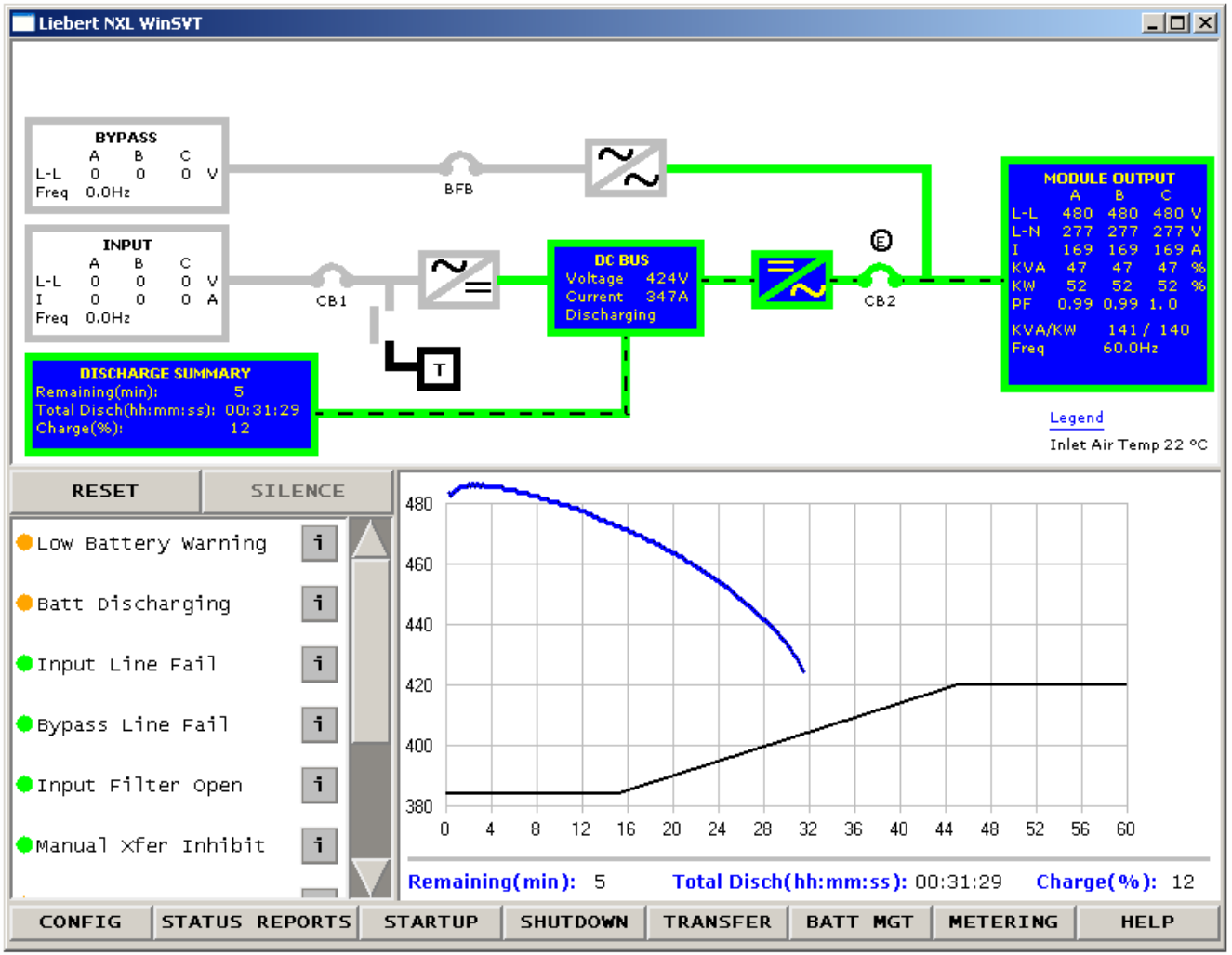


# HMI Display

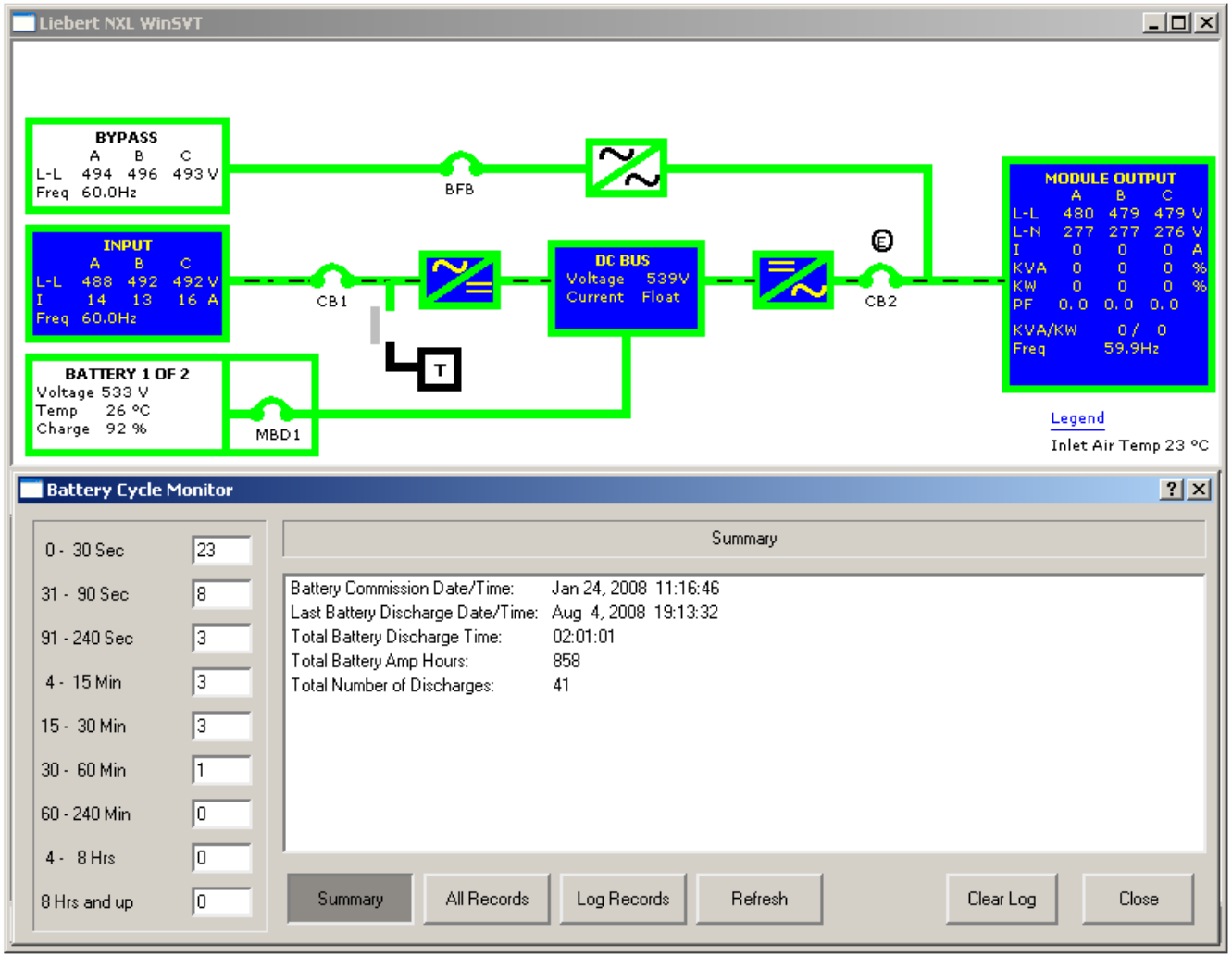



Multi-purpose display

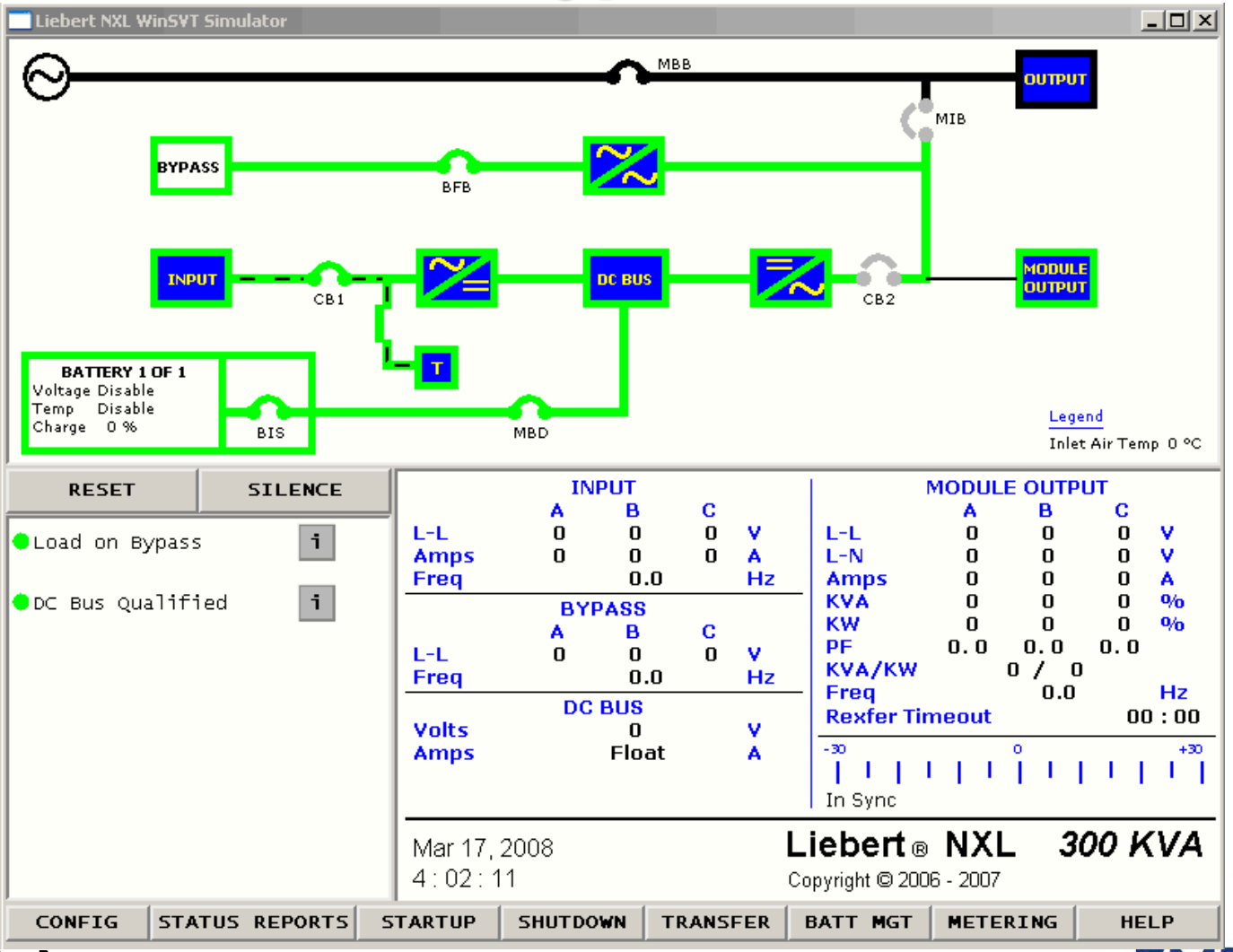
# Battery Discharge Graph



# Battery Cycle Monitor



# On Maintenance Bypass



# Large UPS – Comparisons

| Characteristic | PW 9395 | Liebert Series 610 | Liebert NXL |
|---|---|---|---|
| Redundant Power Supply | Yes (2) | Yes (2) | Yes (4) |
| Overload Capacity | Low | Medium | High |
| Component Count | High | Low | Low |
| Galvanic Isolation | No | Yes | Yes |
| Un-fused Static Bypass | No | No | Yes |
| SCR Rectifier | No | Yes | Yes |
| Active Battery Components | Yes | No | No |
| Leading PF w/o derating | Yes | No | Yes |
| Stacked performance | No | No | Yes |

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# Benefits of a Transformer Based UPS

- **Personnel Safety**
- Helps mitigate arc flash
  - Full galvanic isolation – DC ground fault
- **Availability**
  - Dual input sources
  - Lower & more predictable management of fault current
  - Better DC fault management
- **Flexibility**
  - Facilitates Vin ≠ Vout
- **Reduced parts count**

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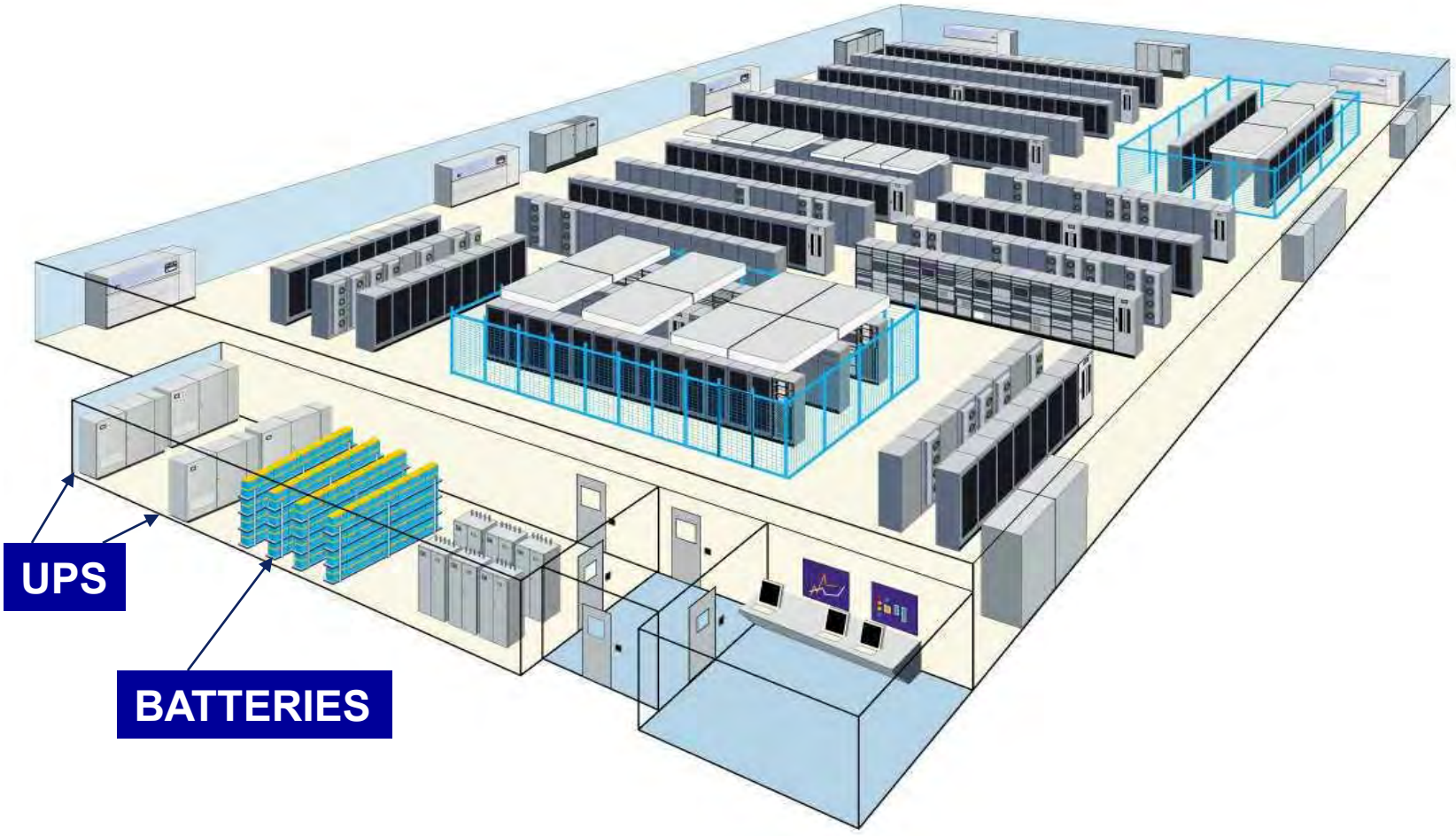
# Data Center Applications – 3PH

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**UPS:** Uninterruptible Power System

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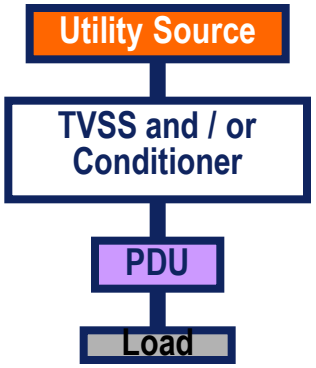
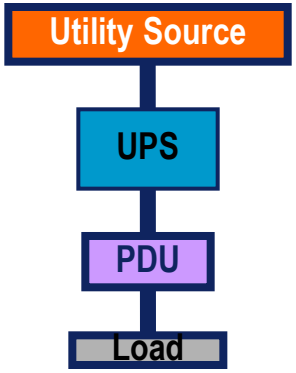
# Types of Systems

## TIER 1
### HW Protection

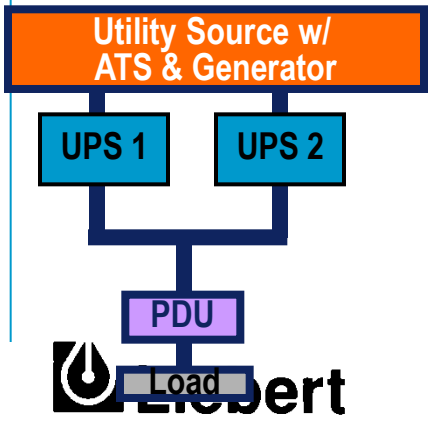



## TIER 2
### Preserve Data

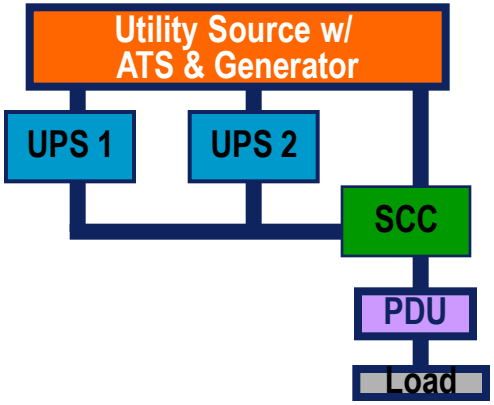



## TIER 3: Increase Uptime

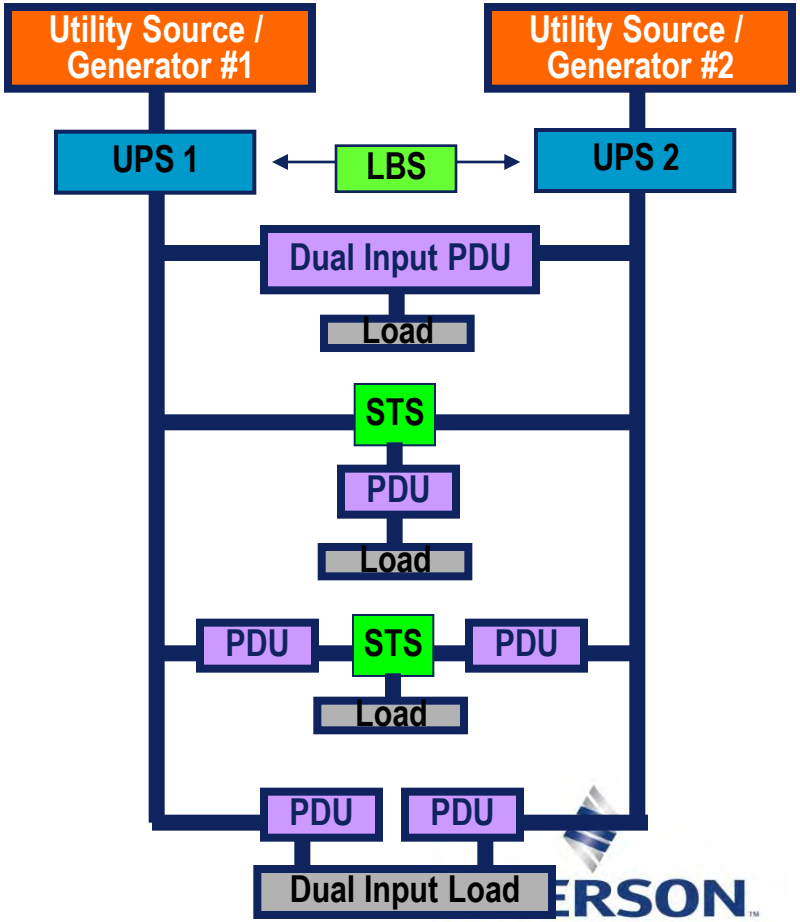
### 1 + 1 Redundant




### Parallel Redundant




## TIER 4: No Downtime
### Distributed Redundant

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# Foundation Power Center (FPC)

- So what is a Foundation Power Center?
- It is a PPC in a Foundation
- We have repackaged the PPC to make it fit in with rows of racks or it can still be used as a standalone product
- Added some new features and enhancements

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# Liebert FPC

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# Liebert FPC Specifications

- Ratings
  - 15, 30, 50, 75, 100, 125, 150, 200, 225, 300kVA
- Voltages
  - Input – 208, 380, 400, 415, 480, 600V
  - Output – 208/120V, 380/220V, 400/230V, 415/240V
- Frequency
  - 50 or 60 Hz

# Liebert FPC Front View

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# Liebert FPC Rear View

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# Liebert FPC Rear View

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# Liebert FPC Specifications

- Standard Unit includes
  - Main input breaker with shunt trip
  - Copper Isolation transformer
  - Computer Grade Grounding
  - Front and rear access only
  - SqD Inline bolt-in panelboards
  - PMP Monitoring
  - Bottom cable exit

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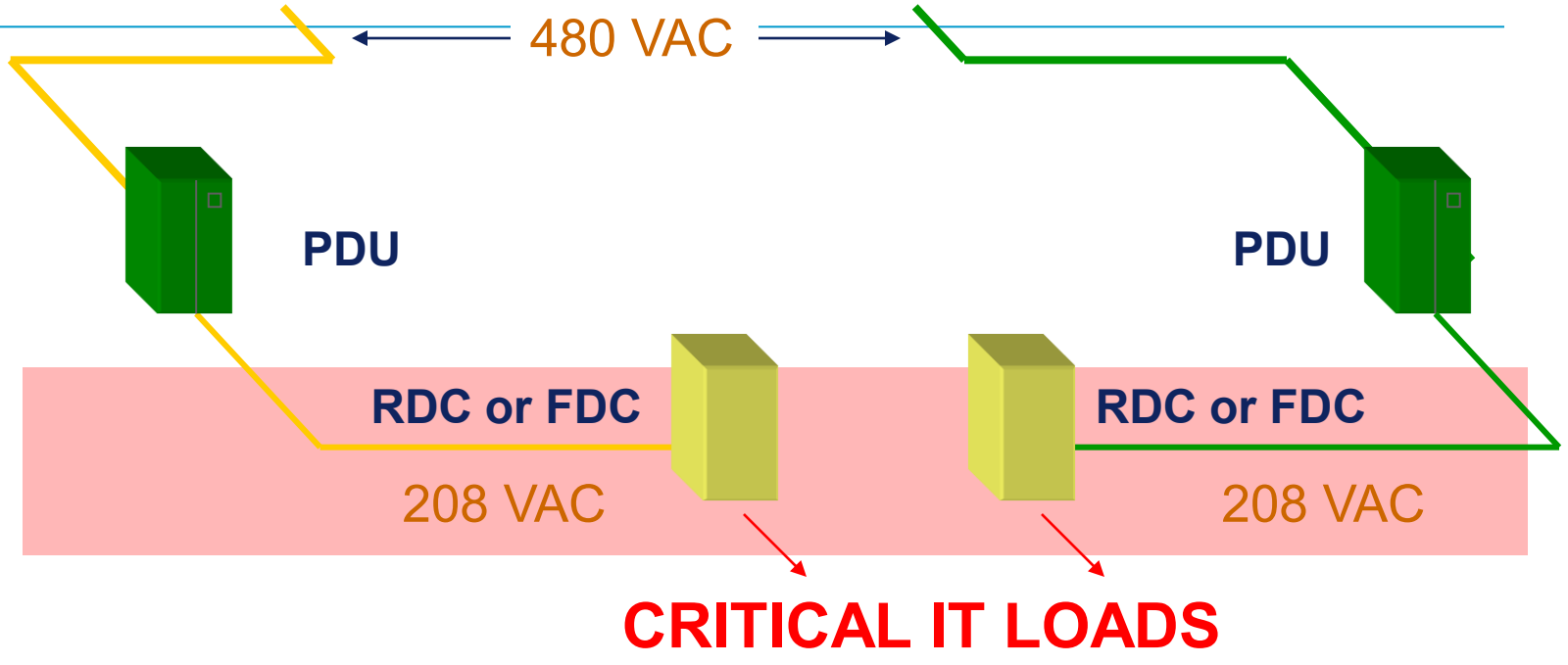
# Data Center Applications – Distribution




## 2-Step Distribution Products

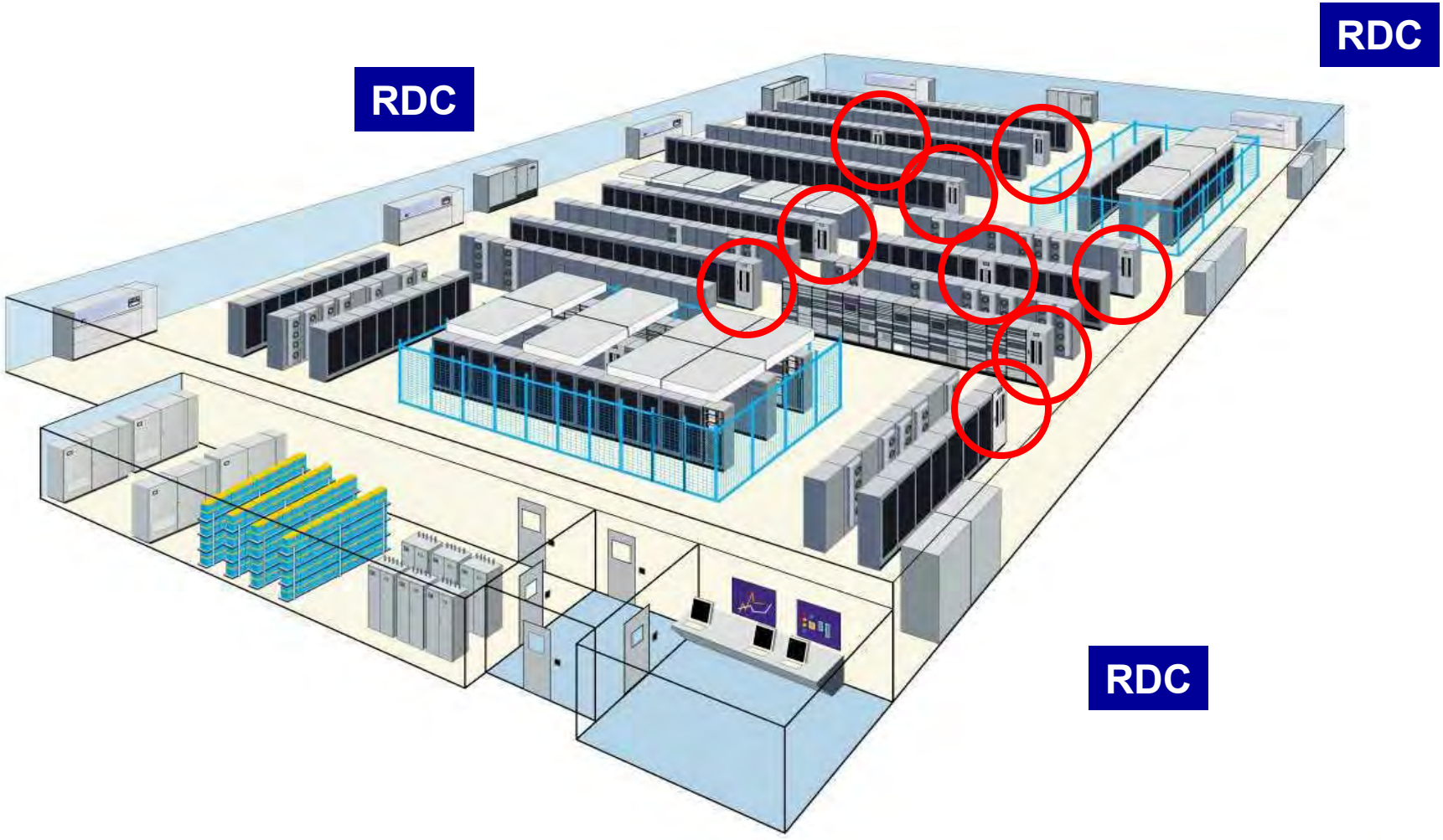
**Foundation Distribution Center**

- Looks like a rack
- Just Panelboards & Monitoring
- Square D and GE Panels
- Typically $208_{in}$ / $208_{out}$

**Remote Distribution Cabinet**

- Fits neatly on raised floor
- Square D or GE
- Panelboards & Monitoring
- Typically $208_{in}$ / $208_{out}$

# Data Center Applications – RDC (or FDC)

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# Typical System Applications

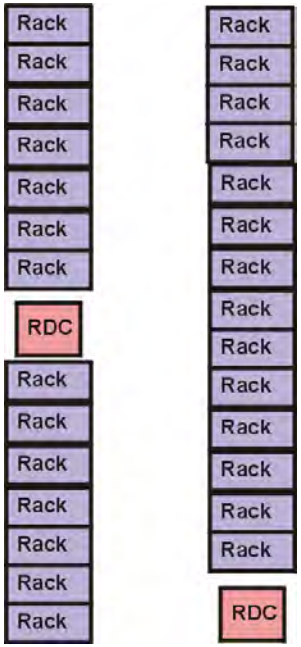


Figure 1

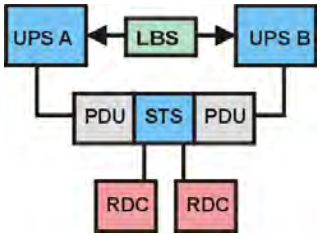


Figure 2

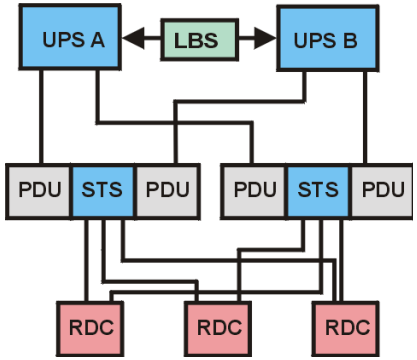


Figure 3

Figure 1 at left shows the two most-common uses of the RDC, in the middle or at the end of a section of equipment racks.

Figure 2 shows a simplified diagram of how the RDC can be applied with a single AC input per cabinet. Two PDU transformers feed a Static Transfer Switch, which in turn feeds two RDCs.

Figure 3 shows three RDCs, each receiving feeds from two Static Transfer Switches (STSs). Each STS is fed by two PDU transformers, which in turn are powered by two different UPSs.

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# Foundation Distribution Center (FDC)

- So what is a Foundation Distribution Center?
- It is a RDC in a Foundation
- We have repackaged the RDC to make it fit in a row of racks or it can still be used as a stand alone product
- Added some new features and enhancements

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# Liebert FDC Specifications

- Sizes – Same as a 19” rack
  - 23.5”Wx38”Dx77”H
- Input/Output Voltages - 208/120V
- One, two, four inputs
- 4 panelboards with main breaker
- Front and rear access only
- Bottom exit

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# Liebert FDC

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# Liebert FDC Specifications

- Enclosure
  - 23.5”Wx38”Dx77”H
  - Color – Black
  - Doors – removable front and back (same doors as offered with Foundation)
  - Side Panels – Removable cable plate, cables can be routed through the bottom of the racks
  - Casters and leveling feet
  - Convection cooled
  - Access – Front and rear only
  - Removable input and output cable trays

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# Main Panelboard Breakers

- Main Panelboard Breakers
  - Located remote from panelboards
- Square D Q2 is standard
  - 225A, 10 kAIC at 208 Vac
  - regardless of panelboard type
  - 22kAIC Option
- Optional Plug-In Main
  - MG NFS (with plug-in base)
  - 225 A, 65 kAIC at 208 Vac
  - quick change-out / replacement

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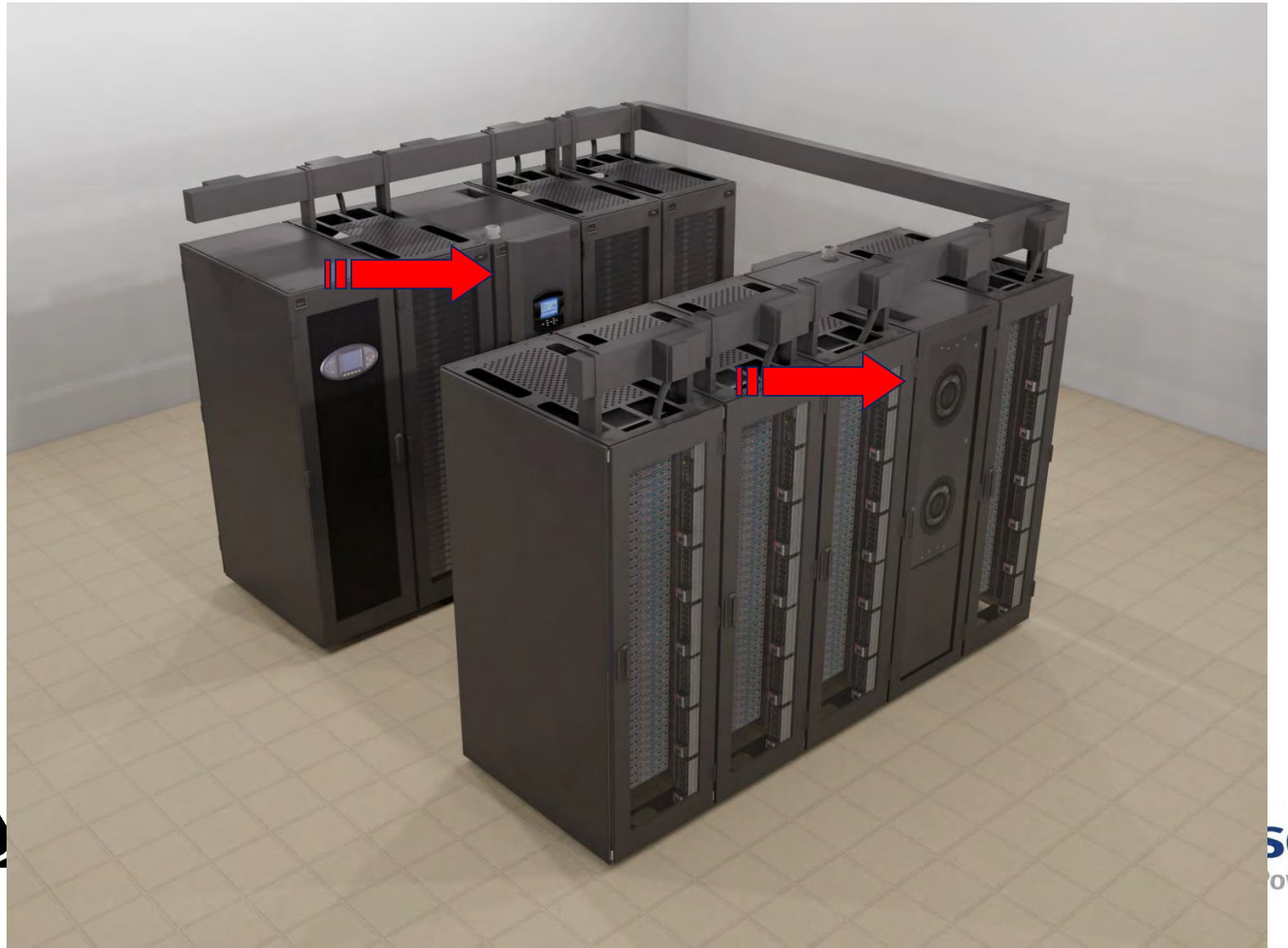
# Opportunities begin with The Rack: DCM

# Add Row Based Power: NX

# Add Liebert MB Modular Busway….

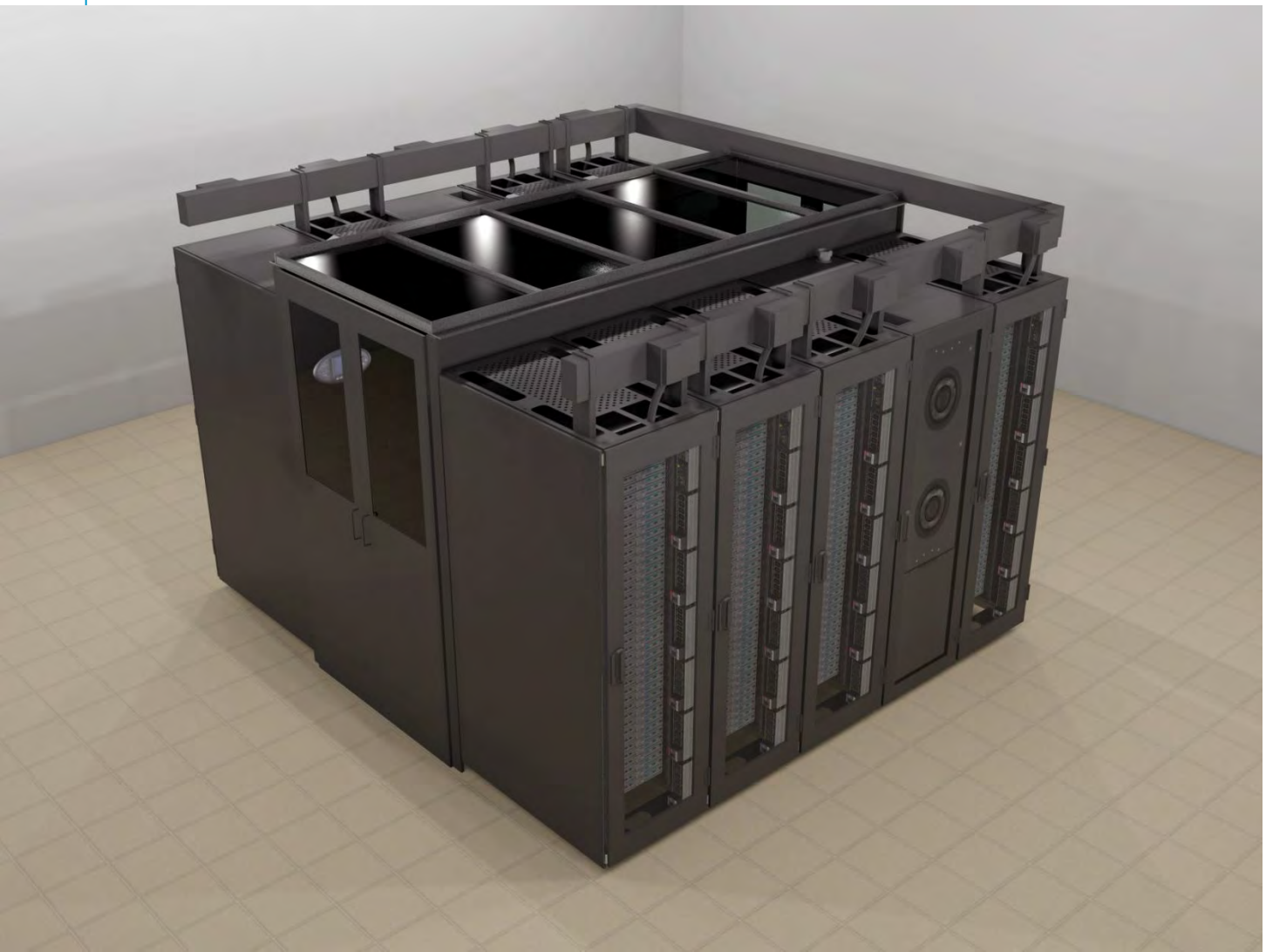
# Add Liebert MPH/X Rack PDUs…

# Add Liebert CRV Row Based Cooling….

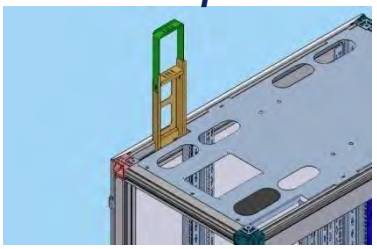


# Add SmartAisle Containment…

# *Integration begin with Our Rack*



***DCM Top Cover***



- Busway Power Distribution
- Liebert XDV Mounting
- SmartAisle

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# Questions?

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***juan.carlos.ramirez@emerson.com***

# Thanks!

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